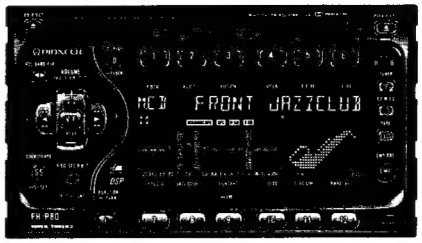
PIONEER®
The Art of Entertainment

Service Manual



ORDER NO.
CRT1736

MULTI-CD CONTROL DSP TUNER CD DECK AMPLIFIER

FH-P80 ES

COMPACT disc DIGITAL AUDIO

NOTE:

- **Dolby noise reduction manufactured under license from Dolby Laboratories Licensing Corporation. "Dolby" and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.**
- **See the separate manual CX-631(CRT1640) for the cassette mechanism description.**
- **The cassette mechanism employed in this model is one of X-2L series**
- **See the service manual CX-540(CRT1574) for the CD mechanism description, disassembly and circuit description.** +4173
- **The CD mechanism employed in this model is one of CX-569 series.**

CONTENTS

● Service Precautions

1. For pickup unit(CGY1031) handling, please refer to"Disassembly"(CX-540 Service Manual CRT1574). During replacement, handling precautions shall be taken to prevent an electrostatic discharge(protection by a short pin).
2. During disassembly, be sure to turn the power off since an internal IC might be destroyed when a connector is plugged or unplugged.
3. This device employs an inverter as the power supply for the EL. The inverter has an output voltage reach approximately 300 volts (AC), under no-load condition and about 190 volts (AC), with the EL connected. Utmost cars should be used not to suffer from a possible electric shock, accordingly.
4. Whenever the amplifier may be put into operation, a heat sink should be mounted. ICs and transistors may be damaged if the amplifier should be put into operation without mounting any heat sink.

PIONEER ELECTRONIC CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan
PIONEER ELECTRONICS SERVICE INC. P.O.Box 1760, Long Beach, CA 90801-1760 U.S.A.
PIONEER ELECTRONIC [EUROPE] N.V. Haven 1087 Keetberglaan 1, 9120 Melsele, Belgium
PIONEER ELECTRONICS ASIACENTRE PTE.LTD. 501 Orchard Road, #10-00, Lane Crawford Place, Singapore 0923

K-FFP. NOV. 1995 Printed in Japan

SPECIFICATIONS - CONTINUED

■ Equalizer amp common section

Maximum current consumption	8.6 A
Maximum power output	35 W x 4
Rated power output	15 W x 4 (1 kHz, 1%) Continuous power output is 15 W per channel min. into 4 ohms, both channels driven 50 to 15,000 Hz with no more than 5% THD.
Subwoofer	Cut-off frequency: 50 Hz, 80 Hz or 125 Hz Cut-off slope: –18 dB/OCT Gain: ±12 dB
Tone controls (parametric)	Bass frequency: 80 Hz, 125 Hz, 200 Hz, 315 Hz Treble frequency: 12.5 kHz, 8 kHz, 5 kHz, 3.2 kHz Equalization range: ±12 dB
3-band parametric equalizer	Frequency: 20 kHz, 12.5 kHz, 8 kHz, 5 kHz, 3.2 kHz, 2 kHz, 1.3 kHz, 800 Hz, 500 Hz, 315 Hz, 200 Hz,125 Hz, 80 Hz, 50 Hz, 31.5 Hz, 20 Hz Equalization range: ±12 dB
Loudness contour	10 dB (100 Hz) 7 dB (10 kHz) (Volume: –30 dB)
Load impedance	4 Ω (4 Ω – 8 Ω allowable)
Pre-out output	Maximum output level: 500 mV Output impedance: 1 kΩ
Power source	14.4 V DC (10.8 – 15.1 V allowable)
Grounding system	Negative type
Dimensions	Installed: 178 (W) x 100 (H) x 155 (D) mm Nose: 170 (W) x 95 (H) x 22 (D) mm
Weight	2.7 kg (including cord unit)

• Specifications and external appearance are subject to change without notice. Products purchased may differ in details from illustrations in this manual.

SPECIFICATIONS

■ Built-in CD player

System	Compact disc audio system
Usable discs	Compact discs
Signal format	Sampling frequency 44.1 kHz Number of quantization bits 16-bit linear
Frequency characteristics	5 – 20,000 Hz (±1 dB)
Signal-to-noise ratio	94 dB (1 kHz) (IEC-A network)
Dynamic range	90 dB (1 kHz)
Number of channels	2 (stereo)

■ Tape deck

Usable casstte tapes	Compact cassette tape (C-30 – C-90)
Tape speed	4.76 cm/sec.(+0.14 cm/sec., -0.05 cm/sec)
Fast forward/rewind time	Approx. 100 sec. for C-60
Wow and flutter	0.09% (WRMS)
Frequency response	Metal: 30 – 19,000 Hz (±3 dB)
Stereo separation	45 dB
Signal-to-noise ratio	Metal: Dolby C NR IN: 73 dB (IEC-A network) Dolby B NR IN: 67 dB (IEC-A network) Dolby NR OUT: 61 dB (IEC-A network)

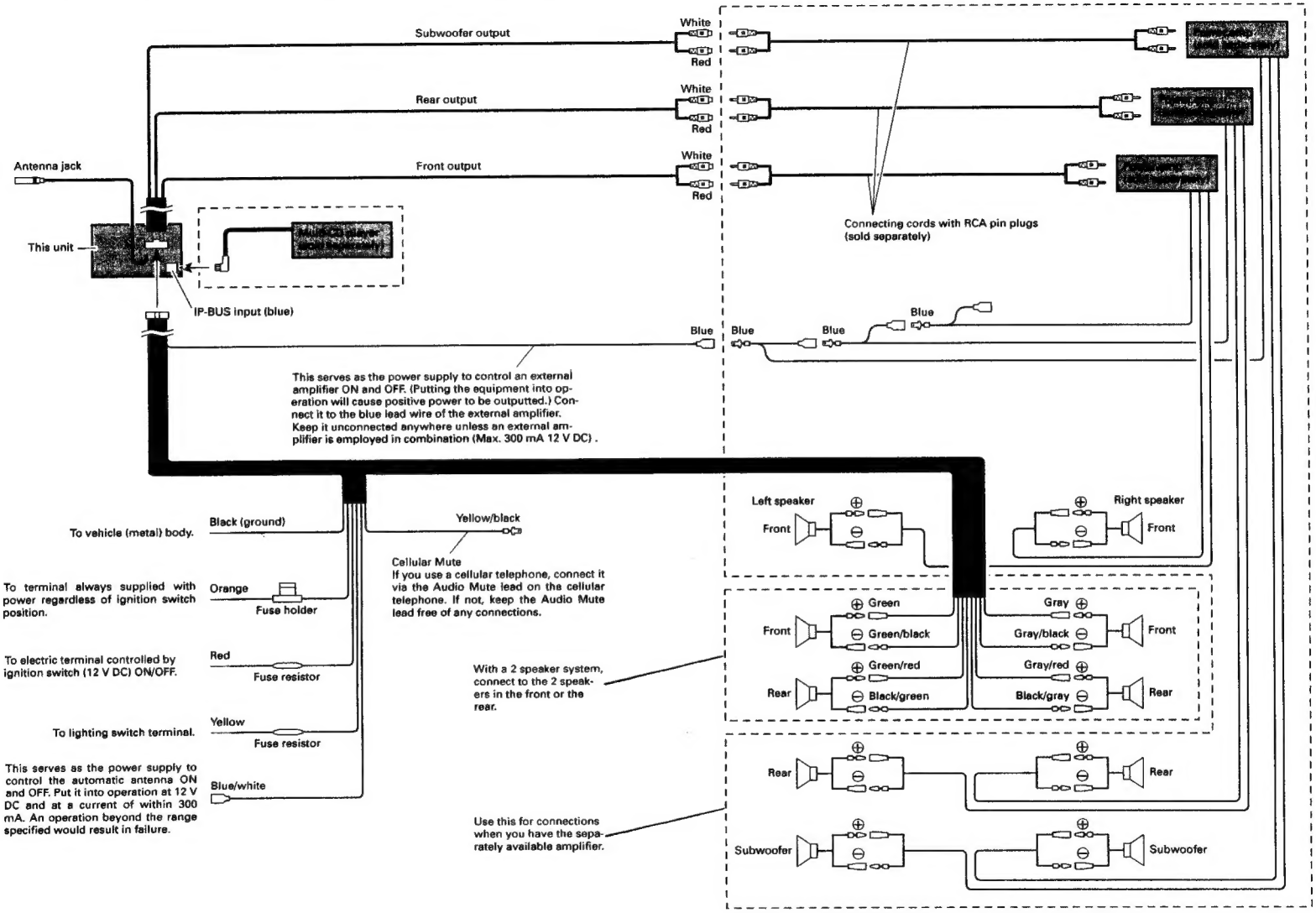
■ FM tuner

Frequency range	87.5 – 108 MHz
Effective sensitivity	11 dBf (0.8 µV/75 Ω, monaural, S/N: 30 dB)
50 dB quieting sensitivity	16 dBf (1.1 µV/75 Ω, monaural)
Signal-to-noise ratio	70 dB (IEC-A network)
Distortion	0.3% (at 65 dBf input, 1 kHz, stereo)
Frequency response	30 – 15,000 Hz (±3 dB)
Stereo separation	40 dB (at 65 dBf input, 1 kHz)

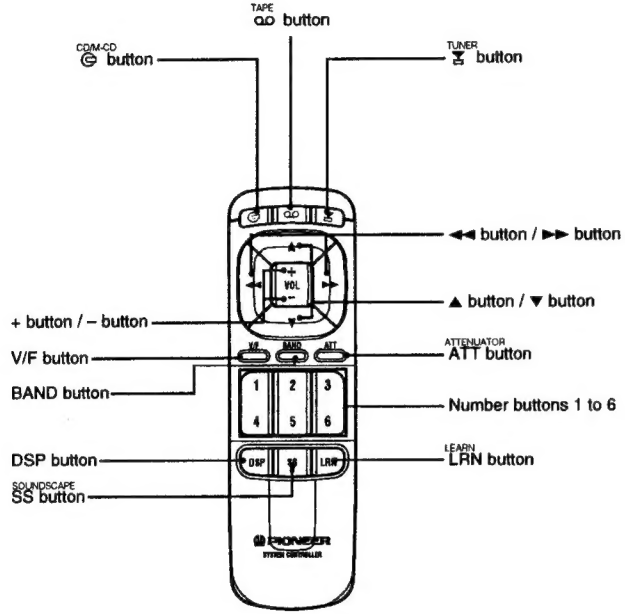
■ AM tuner

Frequency range	531 – 1,602 kHz (9 kHz) 530 – 1,710 kHz (10 kHz)
Effective sensitivity	18 µV (at 25 dB) (S/N: 20 dB)
Selectivity	50 dB (±9 kHz) 50 dB (±10 kHz)

Connection Diagram

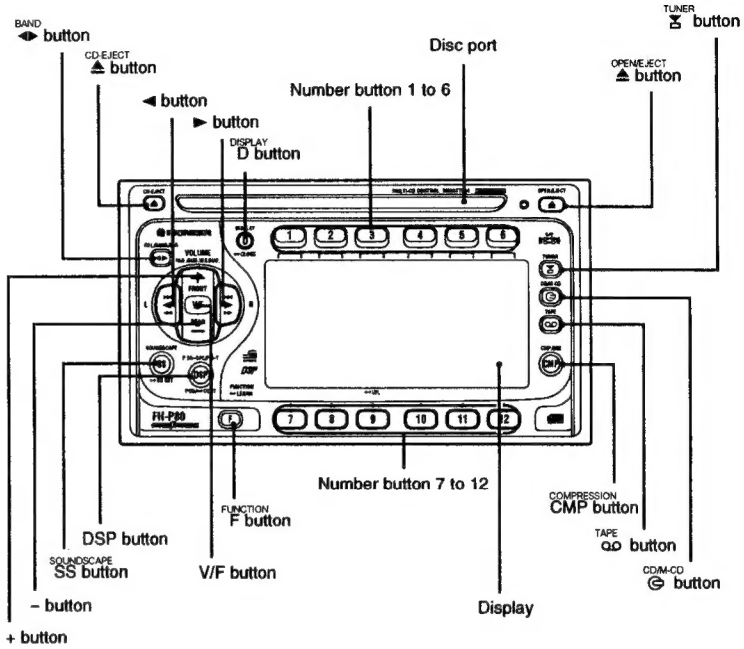


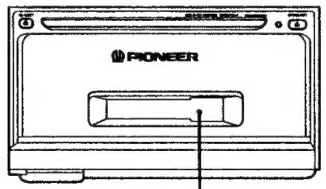
Remote controller

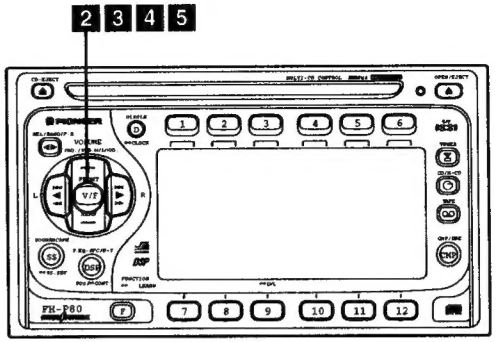


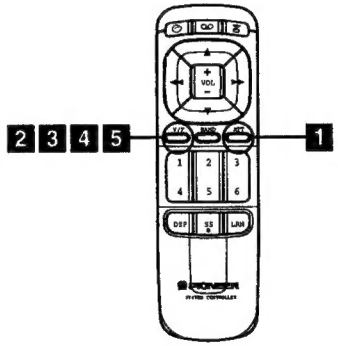
NAMES AND PARTS

The names of the operating buttons of this unit are as follows:









1 [redacted]

This feature allows you to lower the volume at a single touch such as when conversation in the car is hard to hear or when you are stopping at a toll booth.

2 [redacted]

This feature allows you to adjust the audio balance of the speakers front and rear and left and right.

OPTION

3 [redacted]

This feature allows you turn subwoofer output on and off and to adjust the output level.

4 [redacted]

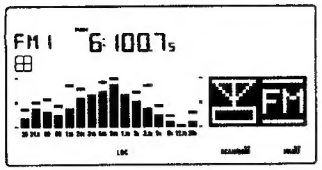
This feature allows you to compensate for apparent lack of low and high frequencies when listening at low volume.

5 [redacted]

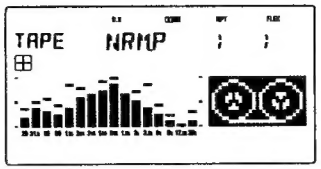
This feature compensates for differences in audio when switching the sound source.

You can check that the sound source has been switched by looking at the display.

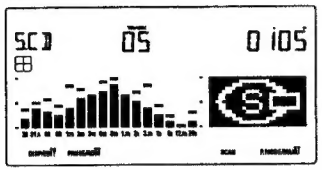
Radio (FM/AM)



Tape deck

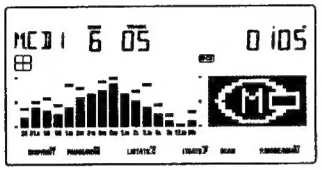


Built-in CD player



AUX (external device)

Multi-CD player

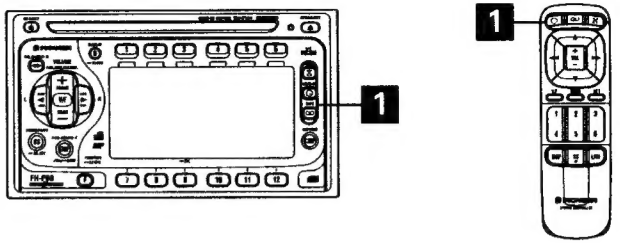


MEMO

- You cannot switch to a sound source that is not connected.
- You cannot switch to the built-in CD player if no disc has been loaded in the built-in CD player.
- You cannot switch to the multi-CD player if no magazine has been loaded in the multi-CD player.
- You cannot switch to the tape deck if no tape has been loaded in the tape deck.
- You cannot switch the sound source to AUX using the remote controller.
- You cannot switch to the AUX source if the AUX source (external device) is not set to ON.
- For details on connecting external devices such as video or DAT decks.

SWITCHING THE SOUND SOURCE

Switching to the desired sound source.



1 Switching the sound source

■ **Press the ⧗ button when switching radio.**

The sound source will be switched as follows each time the button is pressed.

→ Radio (FM/AM) ▸ OFF

■ **Press the ⓒ button when switching between built-in CD player and multi-CD player.**

The sound source will be switched as follows each time the button is pressed.

→ Built-in CD player ▸ Multi-CD player ▸ OFF

■ **Press the ⌾ button when switching between tape deck and AUX.**

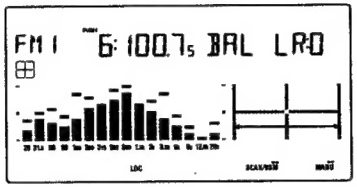
The sound source will be switched as follows each time the button is pressed.

▸ Tape deck ▸ AUX (external device) ▸ OFF

3 Adjusting the balance

■ **Enhance left speaker sound by pressing the ◄ button on the main unit or the ◄◄ button on the remote controller.**
Left speaker sound will be enhanced each time this button is pressed.

■ **Enhance right speaker sound by pressing the ► button on the main unit or the ►► button on the remote controller.**
Right speaker sound will be enhanced each time this button is pressed.



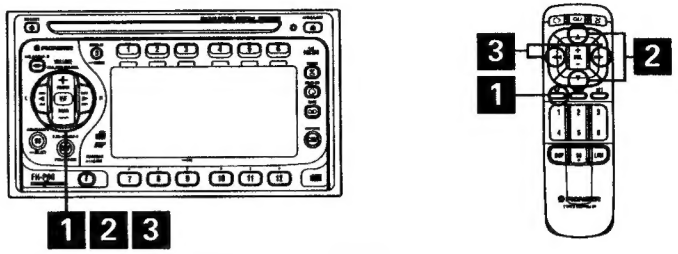
Balance can be adjusted within the range "L:25" to "R:25".

MEMO

- Adjustment mode will be cancelled if no operation occurs within 8 seconds.
- For those using 2-speaker systems, be sure to set "*FAD FR:0*".
- The fader/balance can be set at each position of the listening position setting.
  Selecting a positon at the listening positon setting brings up the lastly fored fader/balance values.

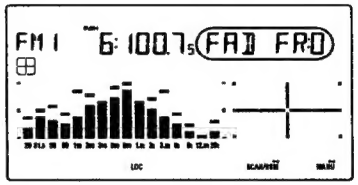
FADER/BALANCE ADJUSTMENT

This feature adjusts the audio balance of the front speakers and rear speakers or the audio balance of the right speakers and left speakers.



1 Selecting adjustment mode

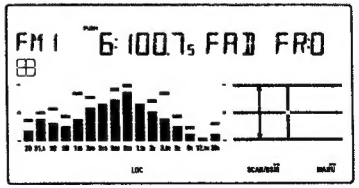
Press the [V/F] button.
The unit will enter fader/balance adjustment mode.



2 Adjusting the fader

■ **Enhance front speaker sound by pressing the [+] button on the main unit or the ▲ button on the remote controller.**
Front speaker sound will be enhanced each time this button is pressed.

■ **Enhance rear speaker sound by pressing the [–] button on the main unit or the ▼ button on the remote controller.**
Rear speaker sound will be enhanced each time this button is pressed.



The fader can be adjusted within the range "F:25" to "R:25".

1 [redacted]

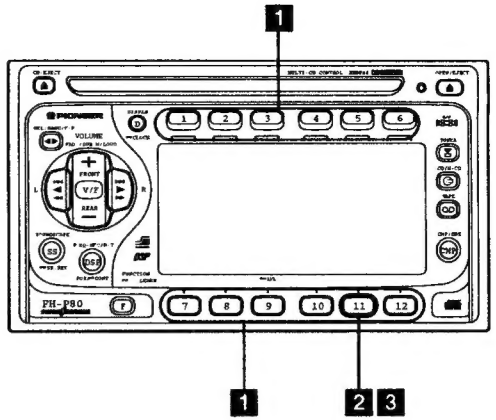
You can set your favorite station in the memory of any button you wish so you can call up that station anytime at a single touch.

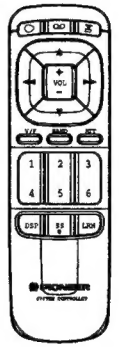
2 [redacted]

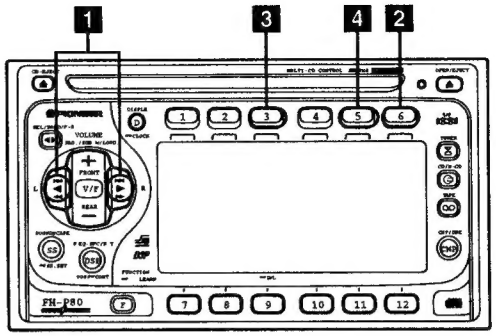
This function automatically searches for stations having the strongest signals and sets them in memory. This is convenient when searching for stations with good reception when you arrive at your destination.

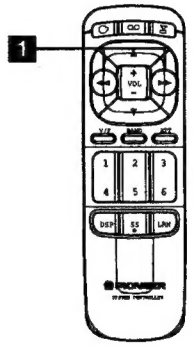
3 [redacted]

This feature calls up stations set in memory one after the other. This is useful when searching for a station to listen to or when checking which stations are set in memory.









1 [redacted]

This feature allows you to easily cue the current track or the next track.
You can reverse or advance through as many tracks as you like by repeating this operation.

2 [redacted]

This feature corrects reduced quality in high frequencies so that even old tapes and poorly recorded tapes can be enjoyed with better sound quality.

3 [redacted]

This feature skips blank parts on cassette tapes. It will automatically cue to the next track if the gap between two tracks is more than 12 seconds.

4 [redacted]

This feature allows you to listen to the same track repeatedly.

● Listening to the Built-in CD Player

1 [redacted]

This feature allows you to easily cue the current track or the next track.

2 [redacted]

The unit includes a COMP function for reducing the sound level differences by suppressing high level sounds and enhancing low level sounds. The unit also includes a DBE function for enhancing low frequencies which often seem lacking inside a car.

3 [redacted]

This feature allows you to listen to the same track repeatedly.

4 [redacted]

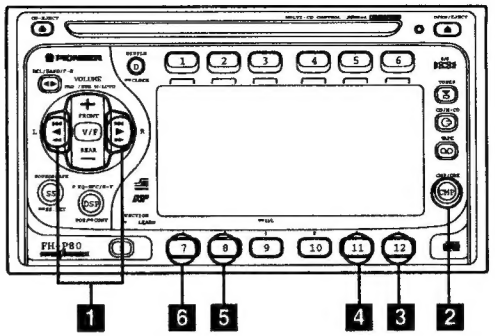
This feature allows you to listen to just the first part of each track on a disc in succession.
This is useful when you want to know what is on a disc or are searching for a track you want to listen to.

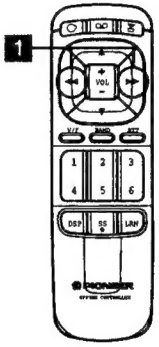
5 [redacted]

This feature plays back the disc leaving the order of track selection up to the microcontroller.
Enjoy listening to a disc in a different track order.

6 [redacted]

This feature allows you to enter a disc title and have that title be displayed when playing back that disc.
Disc playback can be more enjoyable by entering a title you like.





1 [redacted]

This feature allows you to select the disc you want to listen to from all those set in the magazine at a single touch.

2 [redacted]

This feature allows you to easily cue the current track or the next track.

3 [redacted]

This effect is only available when you have connected a multi-CD player (such as the CDX-P2000) which includes a digital compression funtion.
Such players include a COMP function for reducing the sound level differences by suppressing high level sounds and enhancing low level sounds. They also include a DBE function for enhancing low frequencies which often seem lacking inside a car.

4 [redacted]

This feature allows you to listen to the same track repeatedly.
It is also possible to perform repeat playback at the disc level or multi-CD level.

5 [redacted]

This feature allows you to listen to just the first part of each track on a disc in succession.
It is also possible to listen to the first part of the first track on each disc set in the magazine.
This is useful when you want to know what is on a disc or are searching for a track you want to listen to.

6 [redacted]

This feature plays back the disc leaving the order of track selection up to the microcontroller.
Enjoy listening to a familiar disk in a different track order.

7 [redacted]

Store only those tracks you want played back. This allows you to enjoy a disc by storing only those tr acks you really like.

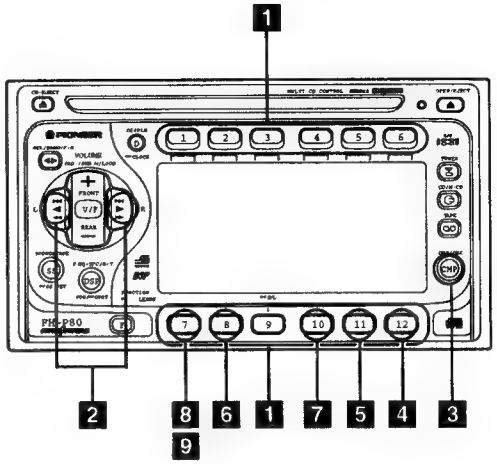
8 [redacted]

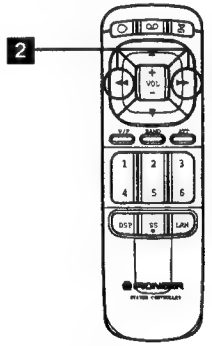
This feature allows you to enter a disc title and have that title be displayed when playing back that disc.
Disc playback can be more enjoyable by entering a title you like.

9 [redacted]

This feature allows you to display the registered disc titles for each disc one by one and select discs for playback by title.

You can also enjoy CDs played on a multi-CD player when a multi-CD player such as a CDX-P2000 is connected.





Soundscape function

The Soundscape function allows two sources to be played simultaneously.
By playing the main source (music) and subsource (sound effects) simultaneously, it becomes as if you were in the place represented by the sound effects.
"Music plus sound effects" allows you to enjoy a new sound field with increased realism.

1 [illegible]

It is possible to physically experience a whole new location by playing back two sources at once (music and sound effects).
Through combined use of a multi-CD player, it is possible to insert sound effects into a track played on the multi-CD player or to insert sound effects in the gaps (blank space) between tracks.
- Only the built-in CD player can be used for the subsource.

2 [illegible]

It is possible to adjust the volume of just the subsource (sound effects) while leaving the volume of the main source (music) alone.

3 [illegible]

It is possible to select and store a sound effect (track) to be played together with the main source.

4 [illegible]

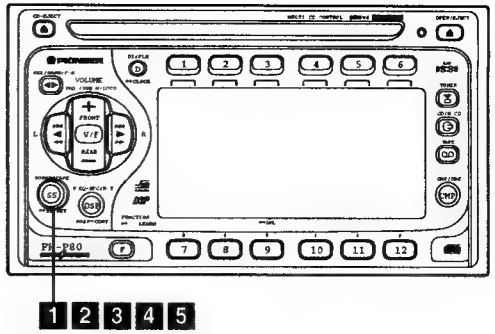
It is possible to select and store a sound effect (track) to be played in the gap between tracks.

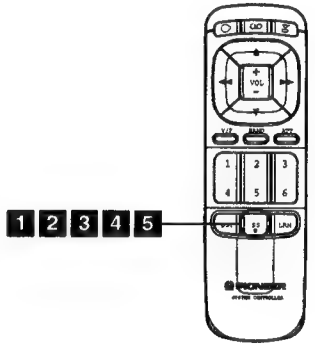
OPTION

5 [illegible]

multi CD player

It is possible to select and store a sound effect (track) to be played with each track of the main source.





1 [redacted]

A program which reproduces 6 typical sound fields including those found in concert halls and stadiums has been prepared. This allows you to experience a realistic sound field as if you were really in the location being reproduced.

2 [redacted]

Five equalizer curves suited to 5 different music genres including rock, pop and fusion have been prepared.

3 [redacted]

This feature allows you to more fully enjoy the music by correcting the equalizer curves to compensate for acoustical characteristics inside your car.

4 [redacted]

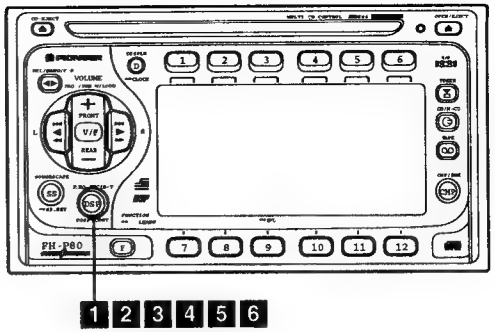
This feature allows you to freely adjust the level of the prepared equalizer curves at each separate frequency. You can also re-adjust an equalizer curve you have already changed. You can also adjust the frequency separately for front/rear speakers at 3 out of 16 points.

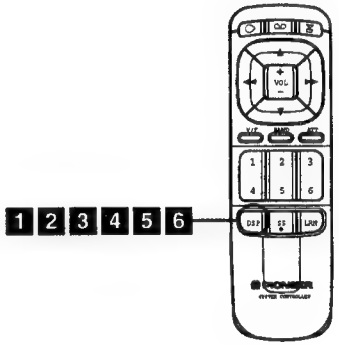
5 [redacted]

This feature allows you to make bass and treble adjustments independently for the front and rear speakers. For example, you can enhance the highs for the front speakers and the lows for the rear speakers to make clear vocals appear to be in a more forward location.

6 [redacted]

This feature allows you to select listening position. The delay time and level used for output from each speaker is automatically adjusted in accordance with the seat position and number of people selected.





3. DISASSEMBLY

● Removing the Case

1. Insert and turn a flat screwdriver to remove the case.
2. Raise the case to remove.

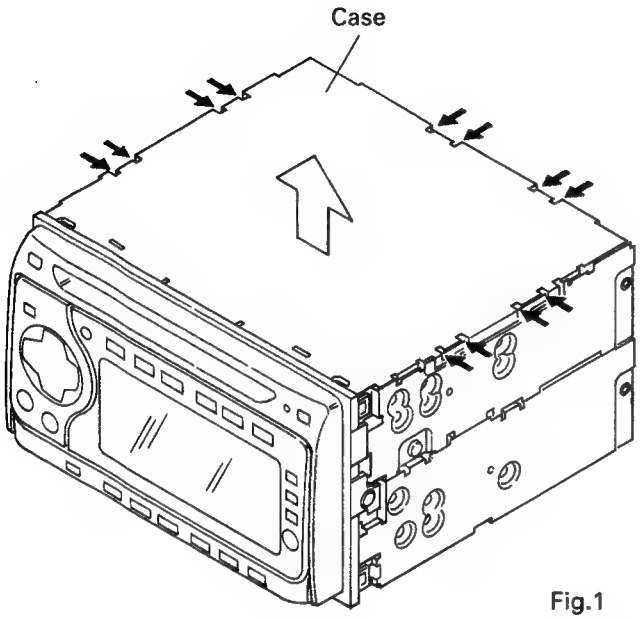


Fig.1

● Removing the Grille Assy

1. Remove the two screws A and three screws B.
2. Disconnect the two connectors.
3. Press the four tabs, and then pull out the grille assy.

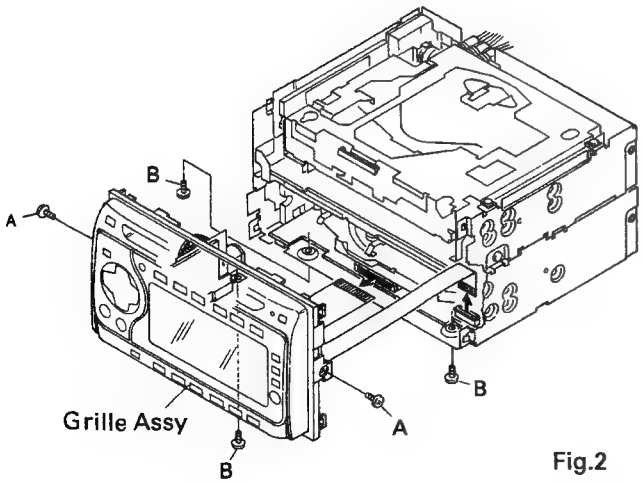


Fig.2

NOTE:

When reassembling the grille assy, use a pair of tweezers of the like to keep holding the flexible P.C.Board so that it will enter under the cassette mechanism module.

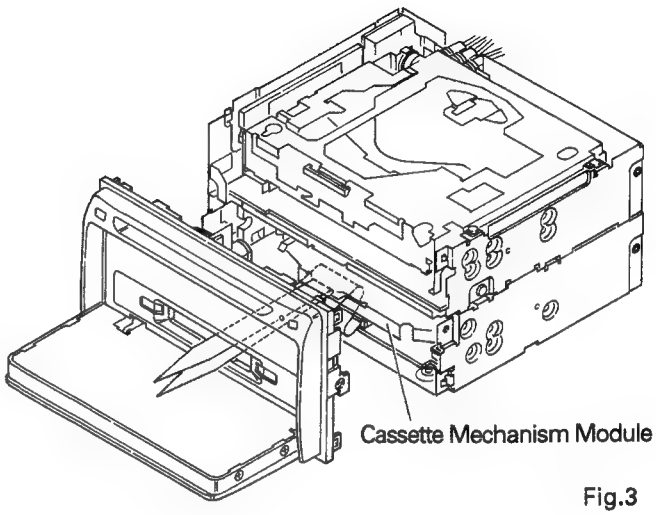


Fig.3

● Removing the Operation Flap Section

1. Remove the two springs and two washers.
2. Remove the four screws.
3. Remove the operation flap section.

NOTE:

Use utmost care to mount the spring while assembling the operation flap section.

*Operation flap = Open and close display

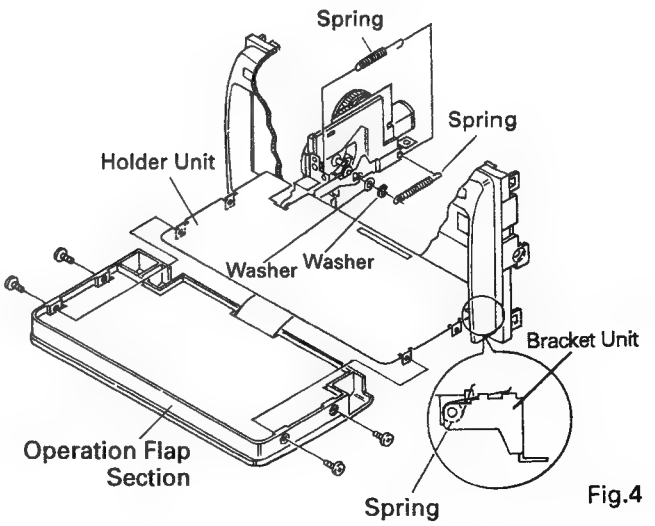


Fig.4

● Removing the Drive Assy

1. Remove the screw A and screw B.
2. Disconnect the connector.
3. Remove the drive assy.

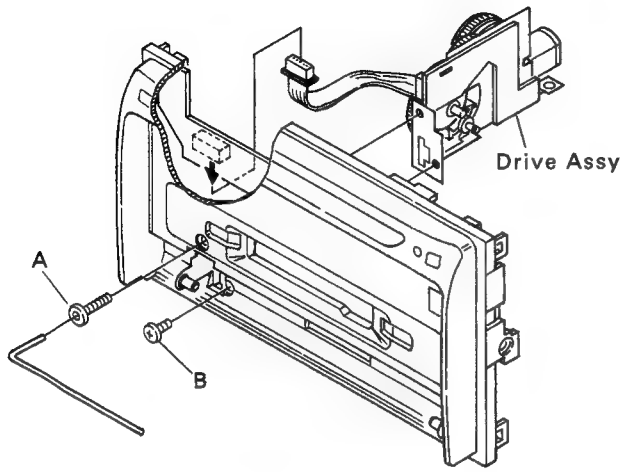


Fig.5

● Removing the Cover, Heat Sink and DSP Amp Assy

1. Disconnect the two connectors.
2. Remove the five screws A, and then remove the cover.
3. Remove the two screws B and three screws C.
4. Remove the heat sink and DSP amp assy.

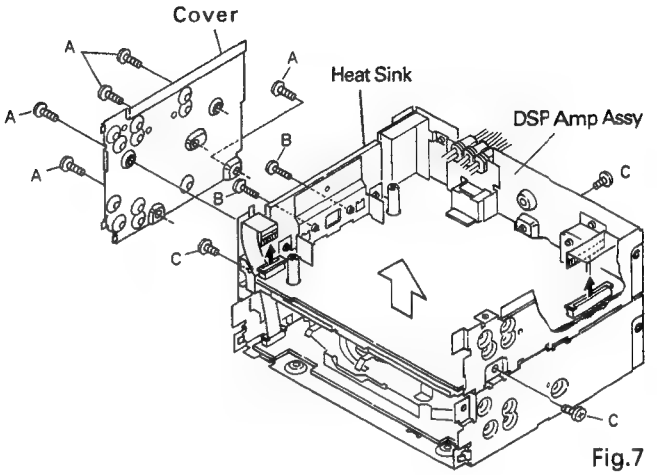


Fig.7

● Removing the CD Mechanism Module

1. Remove the four screws.
2. Disconnect the connector.
3. Remove the CD mechanism module.

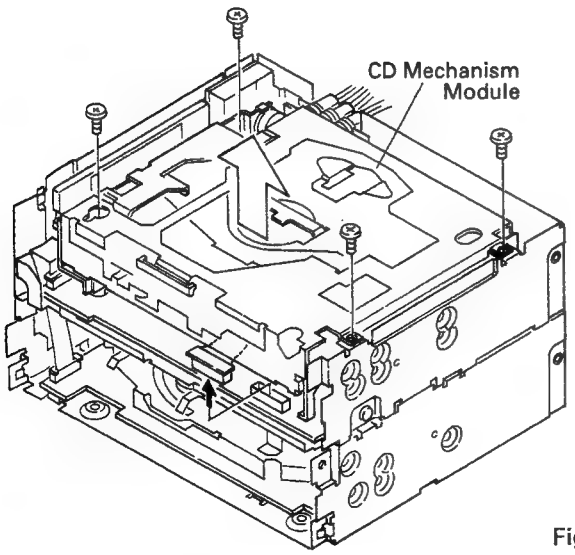


Fig.6

● Removing the DSP Amp Unit

1. Remove the four screws.
2. Unbend the tabs at four locations indicated by arrows until straight.
3. Raise up on DSP amp unit to remove it from chassis unit.

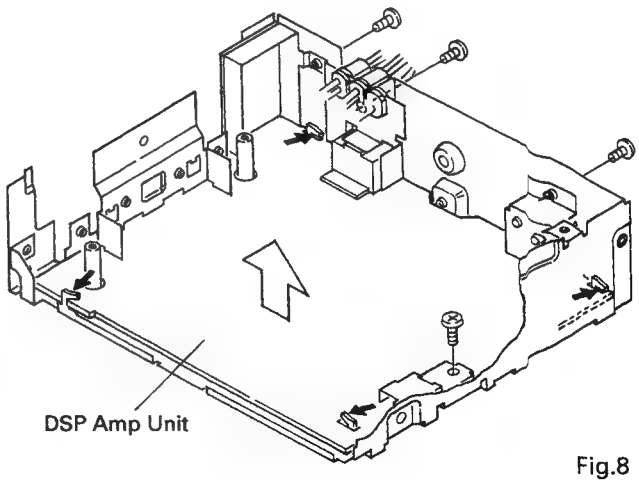


Fig.8

● Removing the Cassette Mechanism Module

1. Remove the four screws.
2. Disconnect the connector.
3. Remove the cassette mechanism module.

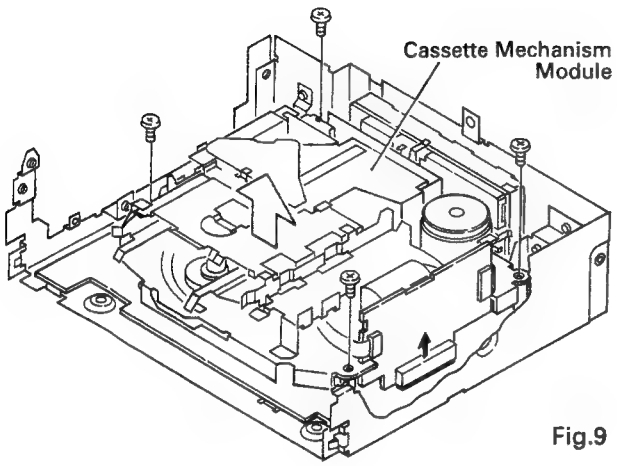


Fig.9

● Removing the Deck Tuner Unit

1. Remove the four screws.
2. Unbend the tabs at four locations indicated by arrows until straight.
3. Raise up on deck tuner unit to remove it from chassis unit.

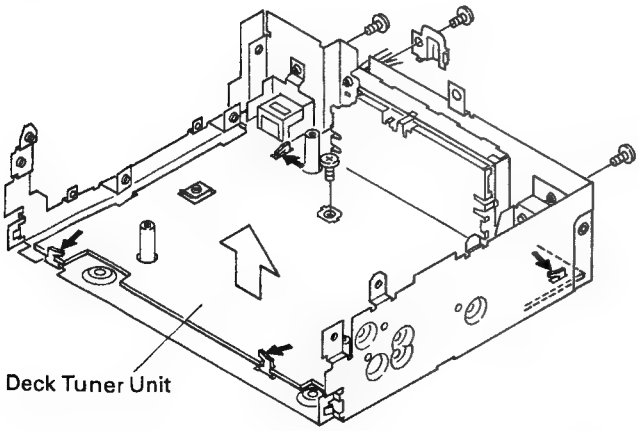


Fig.10

4. ADJUSTMENT

4.1 CD PLAYER SECTION

1)Precautions

· This unit uses a single power supply (+5V) for the regulator. The signal reference potential, therefore, is connected to REFO1(approx. 2.5V) instead of GND.
If REFO1 and GND are connected to each other by mistake during adjustments, not only will it be impossible to measure the potential correctly, but the servo will malfunction and a severe shock will be applied to the pick-up. To avoid this, take special note of the following.
Do not connect the negative probe of the measuring equipment to REFO1 and GND together. It is especially important not to connect the channel 1 negative probe of the oscilloscope to REFO1 with the channel 2 negative probe connected to GND.
Since the frame of the measuring instrument is usually at the same potential as the negative probe, change the frame of the measuring instrument to floating status.
If by accident REFO1 comes in contact with GND, immediately switch the regulator or power OFF.

· Always make sure the regulator is OFF when connecting and disconnecting the various filters and wiring required for measurements.

· Before proceeding to further adjustments and measurements after switching regulator ON, let the player run for about one minute to allow the circuits to stabilize.

· Since the protective systems in the unit's software are rendered inoperative in test mode, be very careful to avoid mechanical and /or electrical shocks to the system when making adjustment.

· Test mode starting procedure
Switch ACC, back-up ON while pressing the 4 and 6 keys together.

· Test mode cancellation
Switch ACC, back-up OFF.

· Disc detection during loading and eject operations is performed by means of a photo transistor in this unit.Consequently, if the inside of the unit is exposed to a strong light source when the outer casing is removed for repairs or adjustment, the following malfunctions may occur.
*During PLAY, even if the eject button is pressed, the disc will not be ejected and the unit will remain in the PLAY mode.
*The unit will not load a disc.
When the unit malfunctions this way, either re-position the light source, move the unit or cover the photo transistor.

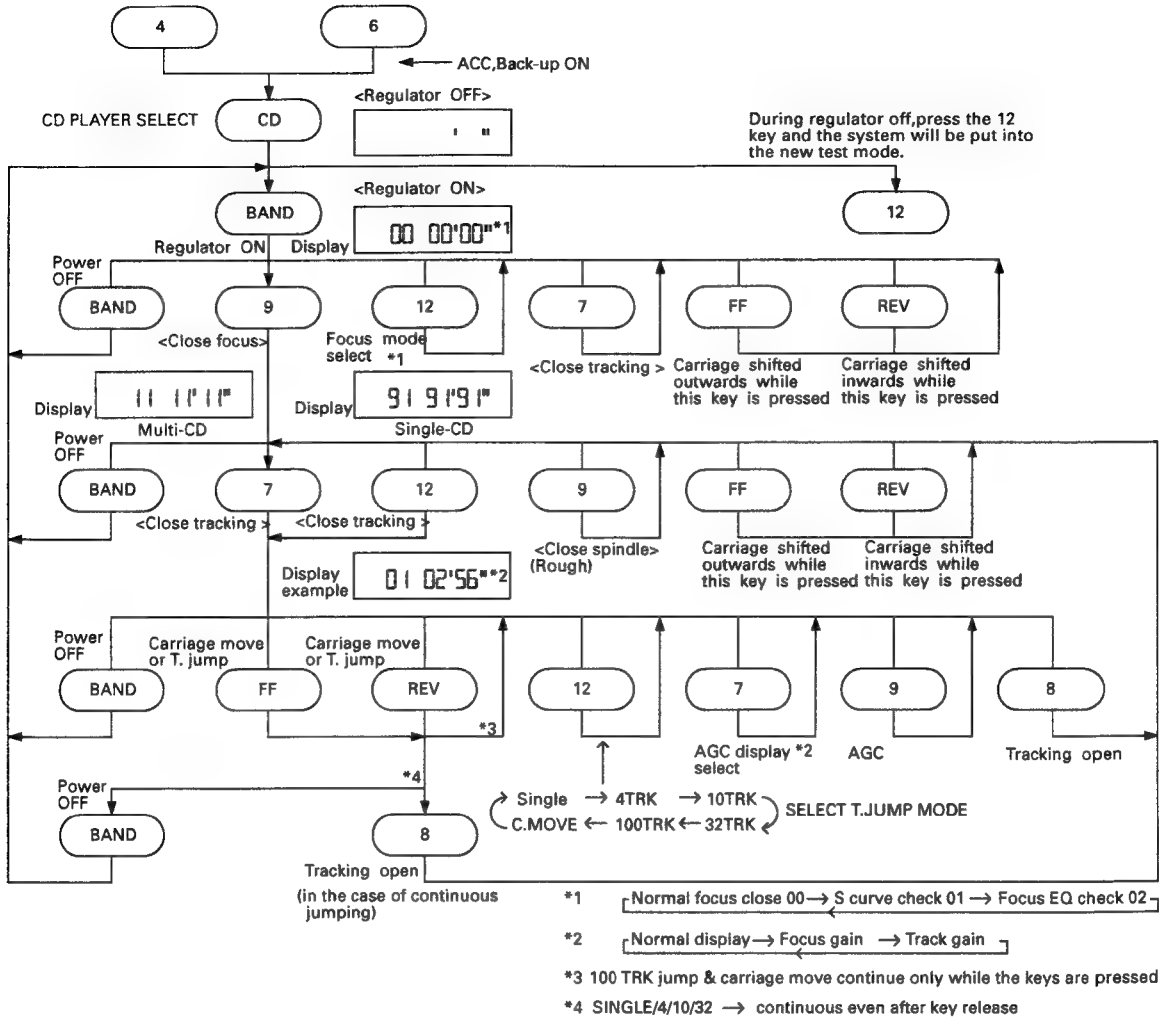
· When loading and unloading discs during adjustment procedures, always wait for the disc to be properly clamped or ejected before pressing another key. Otherwise, there is a risk of the actuator being destroyed.

· Turn power off when pressing the button FF or the button REV key for focus search in the test mode. (Or else lens may stick and the actuator may be damaged.)

· SINGLE/4TRK/10TRK/32TRK will continue to operate even after the key is released. Tracking is closed the moment C-MOVE is released.

· JUMP MODE resets to SINGLE as soon as power is switched off.

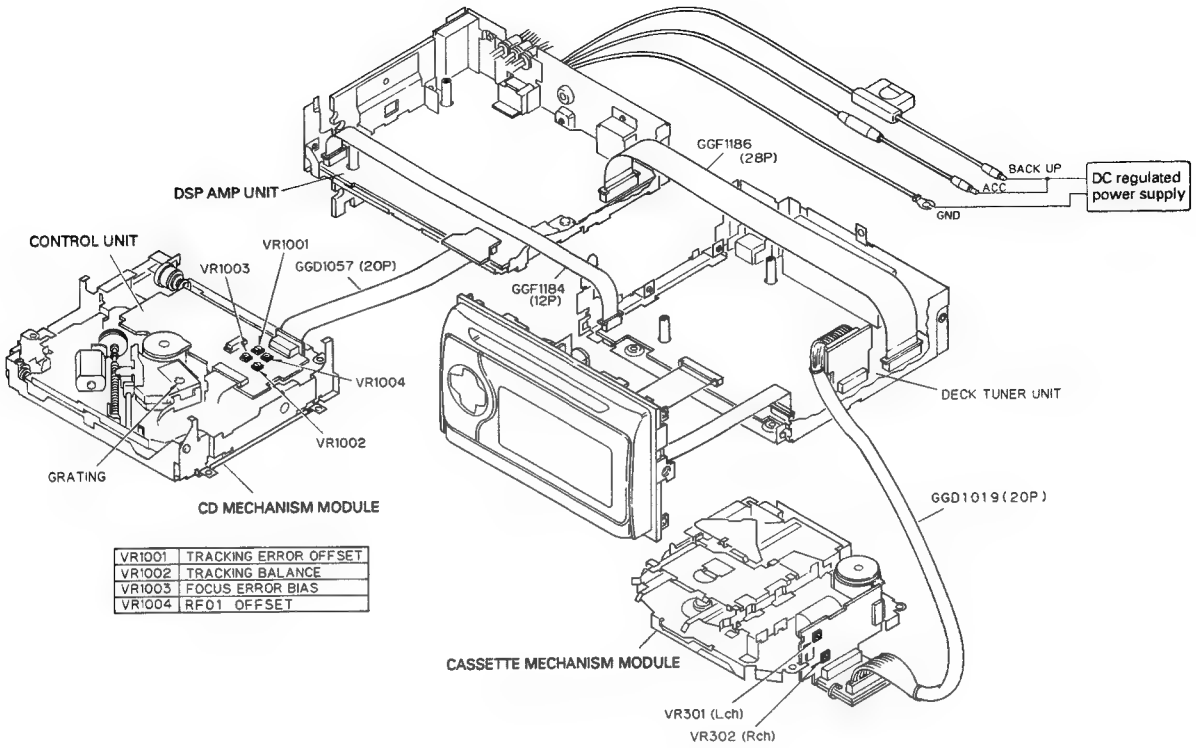
● Flow Chart



● Measuring Equipment and Jigs

Adjustment	Measuring equipment & jigs
1 Tracking Error Offset Adjustment 1	DC V Meter Extension cable:GGD1057
2 Grating Check / Adjustment 1	Oscilloscope, ABEX TCD-784, Two L.P.F., Clock Driver Extension cable:GGD1057
3 Grating Adjustment 2	Oscilloscope, Grating Adjustment Filter (B.P.F.), mV Meter, ABEX TCD-784, Two L.P.F., Clock Driver Extension cable:GGD1057
4 Tracking Balance Adjustment 1	Oscilloscope, L.P.F., ABEX TCD-784 Extension cable:GGD1057
5 Focus Bias Adjustment	Oscilloscope, ABEX TCD-784 Extension cable:GGD1057
6 RFO1 Offset Adjustment	Oscilloscope, ABEX TCD-784 Extension cable:GGD1057
7 Tracking Error Offset Adjustment 2	DC V Meter Extension cable:GGD1057
8 Tracking Balance Adjustment 2	Oscilloscope, L.P.F., ABEX TCD-784 Extension cable:GGD1057

● Adjustment Point



VR1001	TRACKING ERROR OFFSET
VR1002	TRACKING BALANCE
VR1003	FOCUS ERROR BIAS
VR1004	RF01 OFFSET

Fig.11

● Test Point

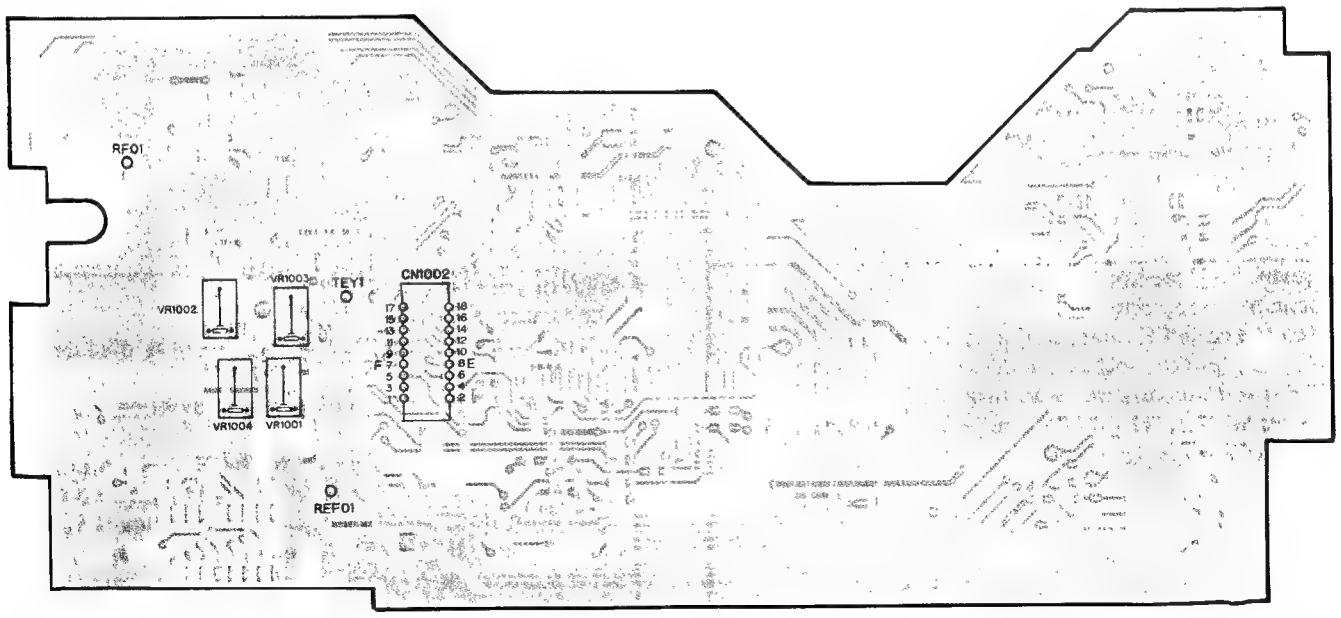
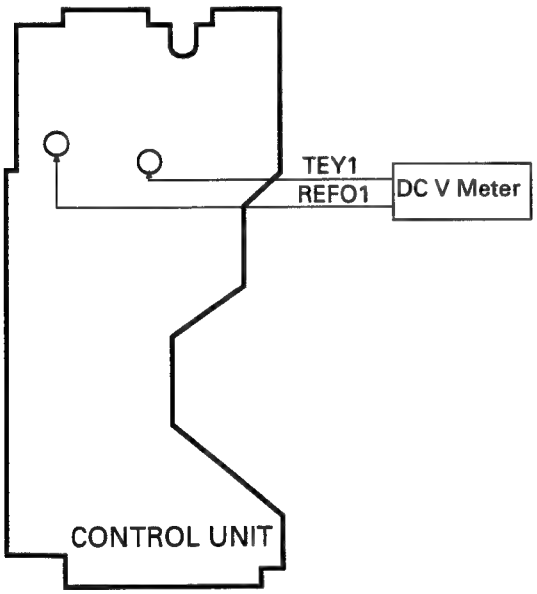


Fig.12

1 Tracking Error Offset Adjustment 1

·**Purpose :**
To adjust the offset of the tracking pre-amp to zero.
·**Symptoms of Mal-adjustment :**
Track search NG, carriage runaway, poor playability.

·**Measuring Equipment / Jig**	·DC V Meter, GGD1057
·**Measuring Point**	·TEY1
·**Test Disc , Mode**	·TEST MODE
·**Adjustment Point**	·VR1001(TE OFFSET VR)

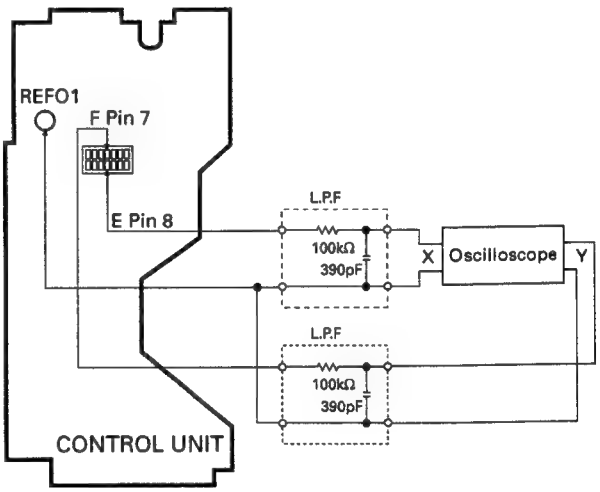


Adjustment Procedure
1.Switch the regulator on.
Select Focus EQ check in Focus mode by pressing Key **12**. And the indication 00 will change to 02.
This mode makes the laser turned off.
2.Using VR1001(TE OFFSET) adjust DC voltage of TEY1 from REFO1 to 0±25mV.

2 Grating Check / Adjustment 1

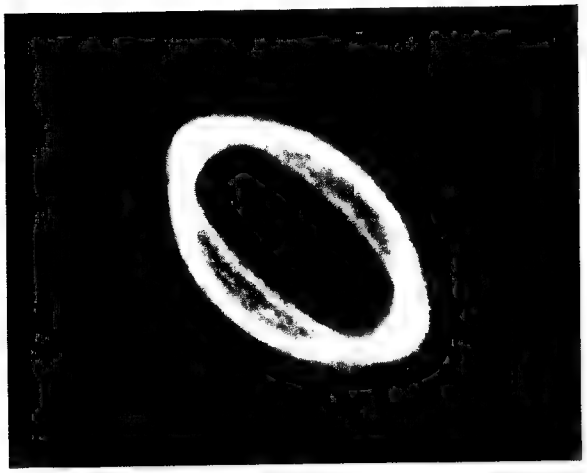
·**Purpose :**
To check that the PU grating is correctly aligned after the PU unit has been replaced.
·**Symptoms of Mal-adjustment :**
Unable to play disc, track skip during search, search NG.

·**Measuring Equipment / Jig**	·Oscilloscope, Two L.P.F., Clock Driver, GGD1057
·**Measuring Point**	·E, F
·**Test Disc , Mode**	·ABEX TCD-784, TEST MODE
·**Adjustment Point**	·Grating hole



Adjustment Procedure
1.Load disc and switch regulator on.
2.Position the PU unit in the center of the disc using the **FF** & **REV** keys.
3.Press key **9** to close focus and press once more to close spindle.
4.Input the L.P.F. output of E to the X axis, and L.P.F. output of F to the Y axis of an oscilloscope by the AC mode, observe lissajous, and check that the grating is within ±45°. (See Waveform 1-3)
5.If the grating is over 45°, make a fine adjustment by slowly turning the screwdriver, so that the lessajous is in line. If, however during the adjustment the screwdriver should be turned too much and the lessajous should become out of line, proceed to the next grating adjustment 2.

Lissajous figure (AC input)
Horizontal axis E 10mV/div.
Vertical axis F 10mV/div.

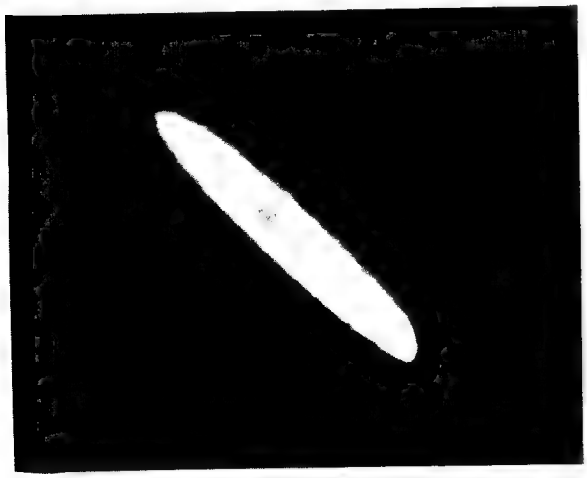


60°=NG

Waveform 1

45°=OK
(Limit)

Waveform 2



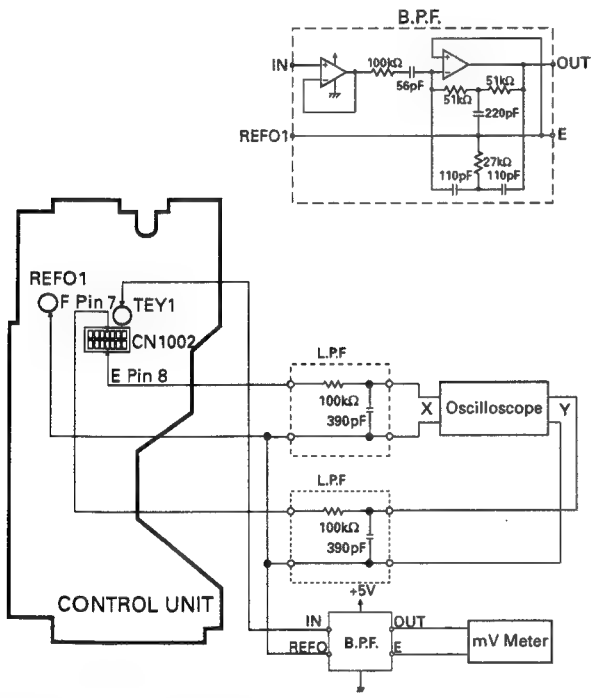
0°=BEST
(Doesn't become a single line due to eccentricity)

Waveform 3

3 Grating Adjustment 2

·**Purpose** :
This needs to be done if the previous adjustment was unsuccessful.
·**Symptoms of Mal-adjustment** :
Unable to play disc, track skipping, track search NG.

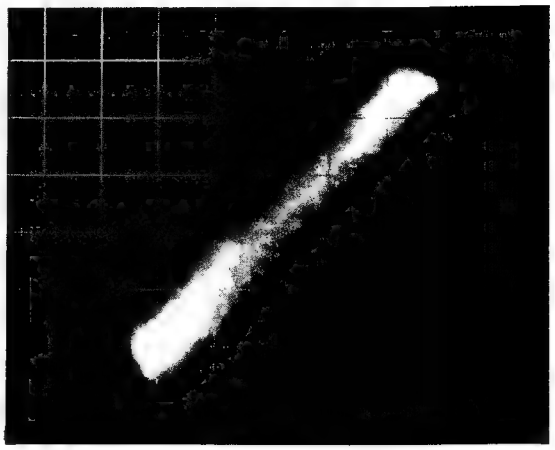
·**Measuring Equipment / Jig**	·Oscilloscope, Grating Adjustment filter (B.P.F.), mV Meter, Two L.P.F., Clock Driver, GGD1057
·**Measuring Point**	·TEY1, E, F
·**Test Disc , Mode**	·ABEX TCD-784, TEST MODE
·**Adjustment Point**	·Grating hole



Adjustment Procedure
1.Load disc and switch regulator on.
2.Position the PU unit in the center of the disc using the **FF** & **REV** keys.
3.Press key **9** to close focus and press once more to close spindle.
4.While observing the TEY1 filter output using an AC mV meter, use a screwdriver to slowly turn the grating hole.
The AC level, should become larger or smaller by turning the grating hole , try to find the minimum level point.
(This is where the grating is in line on track, and is the "null point".)
5.Turn the screwdriver clockwise from the null point (from the PU under side), so that the lissajous is in line as much as possible.

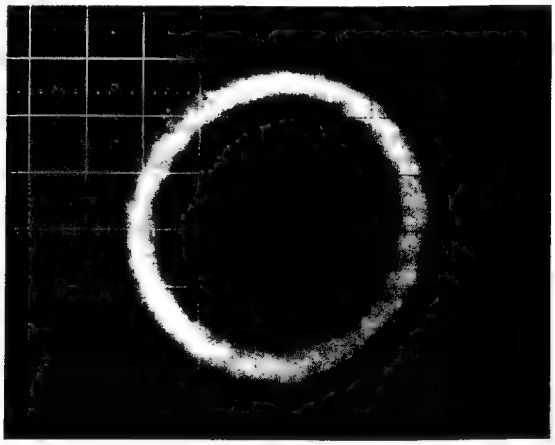
Lissajous figure (AC input)
Horizontal axis E 10mV/div.
Vertical axis F 10mV/div.

Null Point=180°



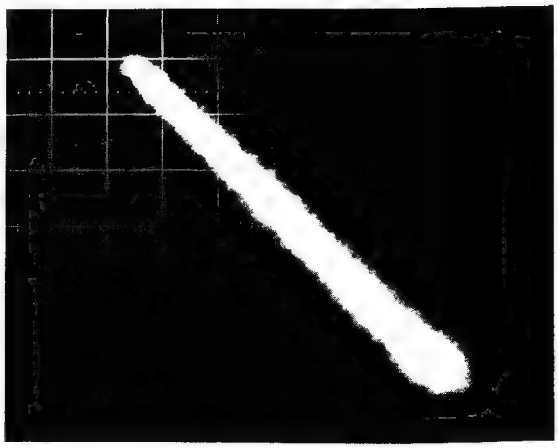
Waveform 4

"Rough" adjustment=90°



Waveform 5

Final adjustment=0°

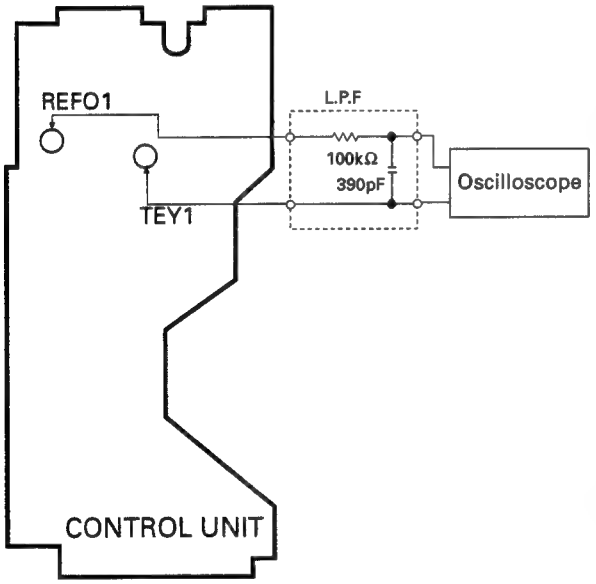


Waveform 6

4 Tracking Balance Adjustment 1

- **Purpose :**
  To equate the sensitivity of the F channel to that of the E channel.
- **Symptoms of Mal-adjustment :**
  Track search NG, poor playability, carriage runaway.

Measuring Equipment / Jig	Oscilloscope, L.P.F., GGD1057
Measuring Point	TEY1
Test Disc , Mode	ABEX TCD-784, TEST MODE
Adjustment Point	VR1002 (T.BAL VR)



Adjustment Procedure

1. Load disc and switch the regulator on.
2. Position the PU unit in the center of the disc using the **FF** & **REV** keys.
3. Close focus by pressing key **9**.
4. Observing the TEY1 waveform on the oscilloscope, adjust VR1002 until the positive and negative halves have the same amplitude (see waveform 7–9).

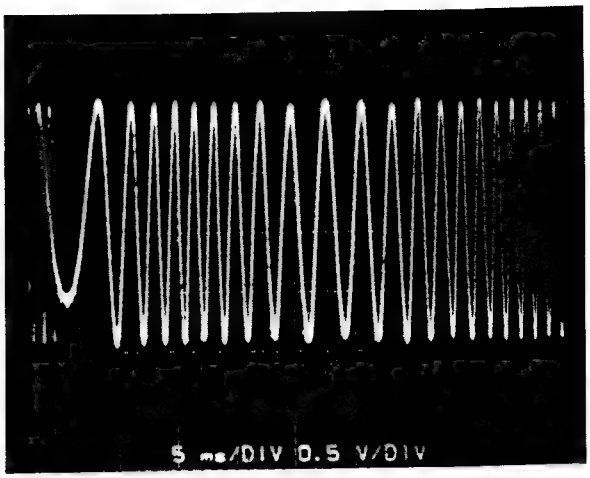
Check

After adjustment the TEY1 waveform should have an amplitude of 1.5±0.65 Vpp.(ABEX TCD-784)
(Providing focus bias is OK)

DC Mode
0.5V/div.
5ms/div.

+5% NG

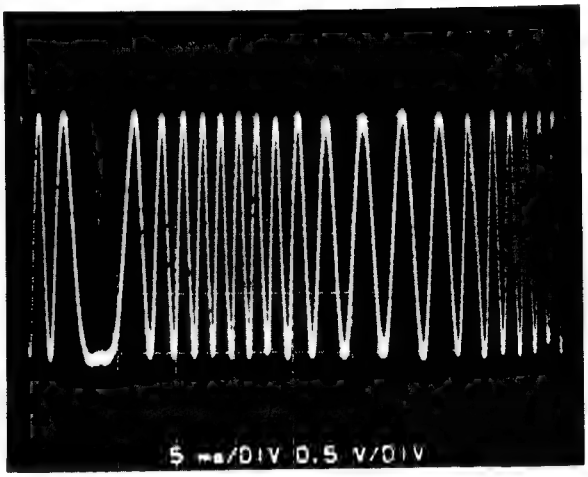
REFO1→



Waveform 7

±0% OK

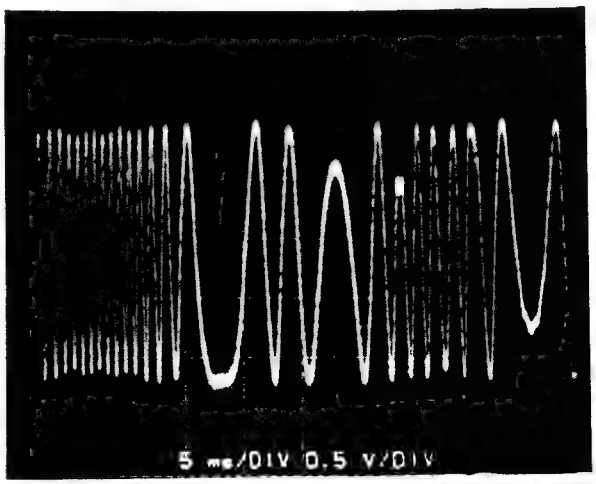
REFO1→



Waveform 8

–5% NG

REFO1→

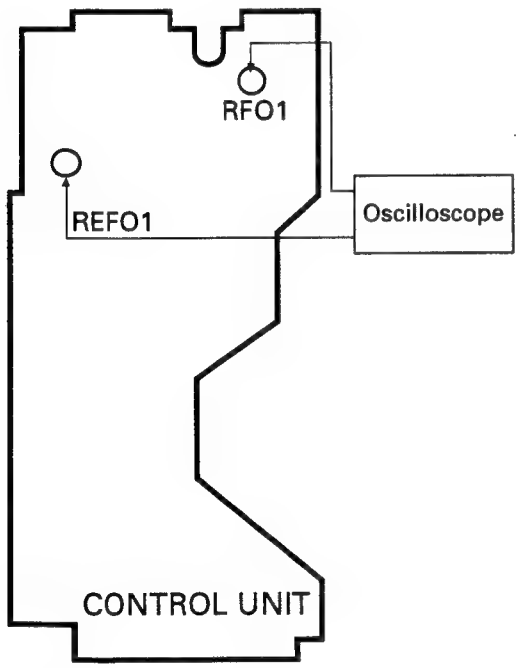


Waveform 9

5 Focus Bias Adjustment

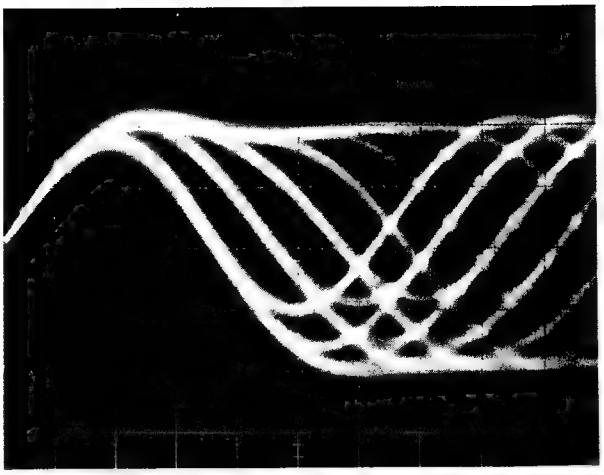
·**Purpose :**
To adjust the focus servo reference so that the RF waveform is an optimum.
·**Symptoms of Mal-adjustment :**
Difficulty in closing focus, poor playability.

·**Measuring Equipment / Jig**	·Oscilloscope, GGD1057
·**Measuring Point**	·RFO1
·**Test Disc , Mode**	·ABEX TCD-784, NORMAL MODE
·**Adjustment Point**	·VR1003 (FE BIAS VR)



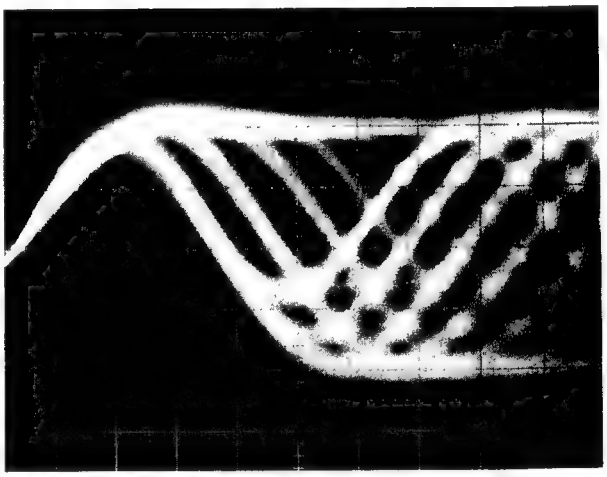
Adjustment Procedure
1. Play track number 18.
2. Observe the RFO1 from REFO1 on an oscilloscope, and adjust VR1003(FE BIAS) so that the RF waveform is maximum and eye pattern is optimum. (See waveform 10, 11)

Check
After adjustment the RFO1 waveform should have an amplitude of 1.7±0.65 Vpp.(ABEX TCD-784)



OK

Waveform 10

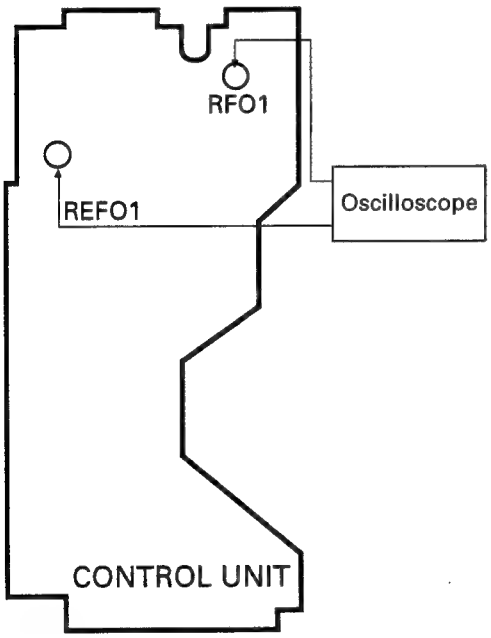


AC Mode Before adjustment Waveform 11

6 RFO1 Offset Adjustment

·Purpose
To adjust the RFO1 waveform offset to an optimum.
·Symptoms of Mal-adjustment
Difficulty in closing focus, poor playability.

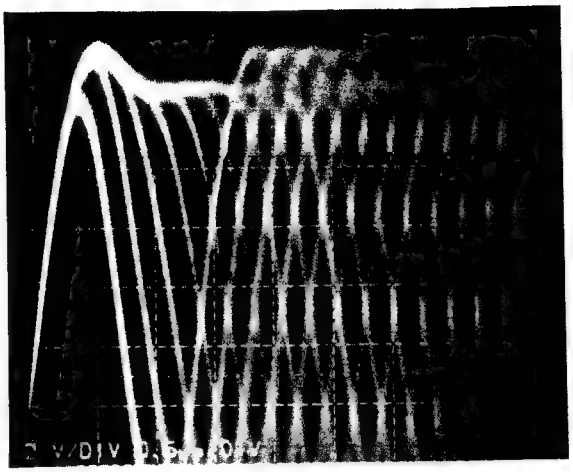
·Measuring Equipment / Jig	·Oscilloscope, GGD1057
·Measuring Point	·RFO1
·Test Disc , Mode	·ABEX TCD-784, NORMAL MODE
·Adjustment Point	·VR1004 (RFO1 OFFSET VR)



Adjustment Procedure
1. Play track number 18.
2. Adjust VR1004 so that the peak value of the upper envelope of the RFO1 waveform is at +1.1VDC w.r.t. REFO1 (See waveform 12–14).

DC Mode
0.2V/div.
0.5µs/div.

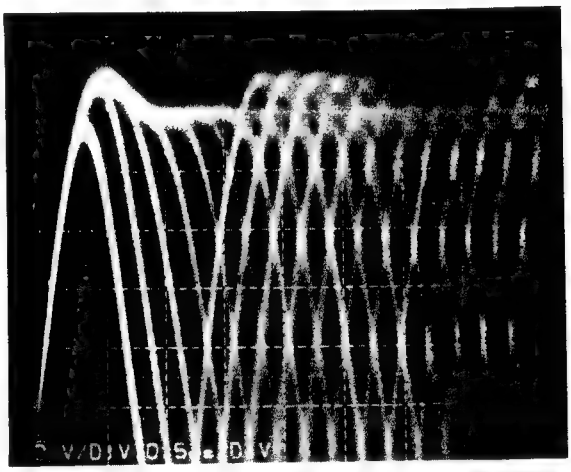
+100mV NG



REFO1→

Waveform 12

OK

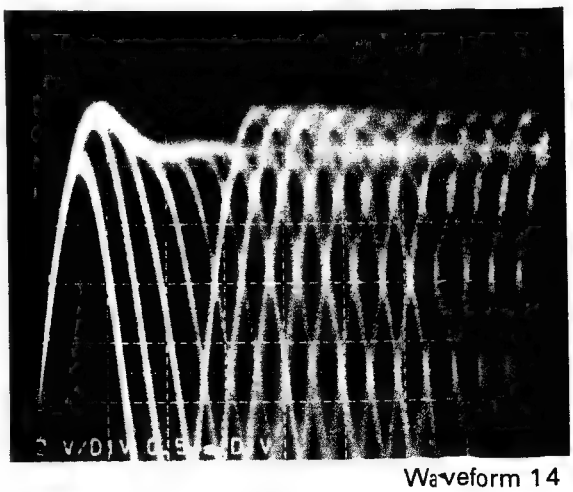


1.1V

REFO1→

Waveform 13

−100mV NG



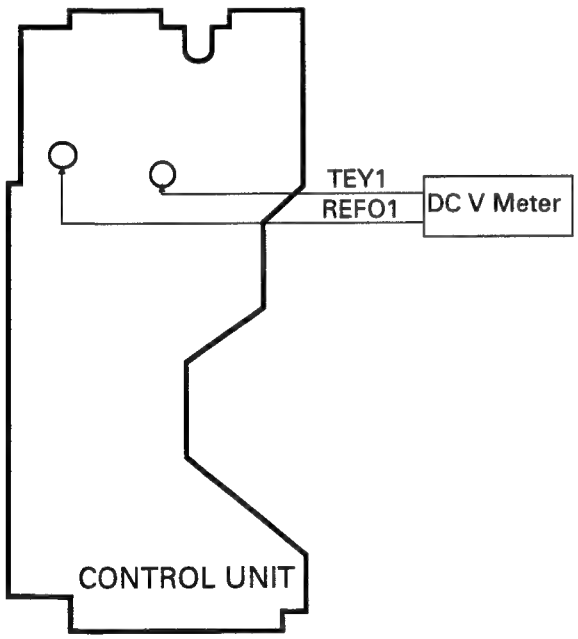
REFO1→

Waveform 14

7 Tracking Error Offset Adjustment 2

·**Purpose :**
To check the offset of the tracking pre-amp is zero and adjust if necessary.
·**Symptoms of Mal-adjustment :**
Track search NG, carriage runaway, poor playability.

·**Measuring Equipment / Jig**	·DC V Meter, GGD1057
·**Measuring Point**	·TEY1
·**Test Disc , Mode**	·TEST MODE
·**Adjustment Point**	·VR1001(TE OFFSET VR)

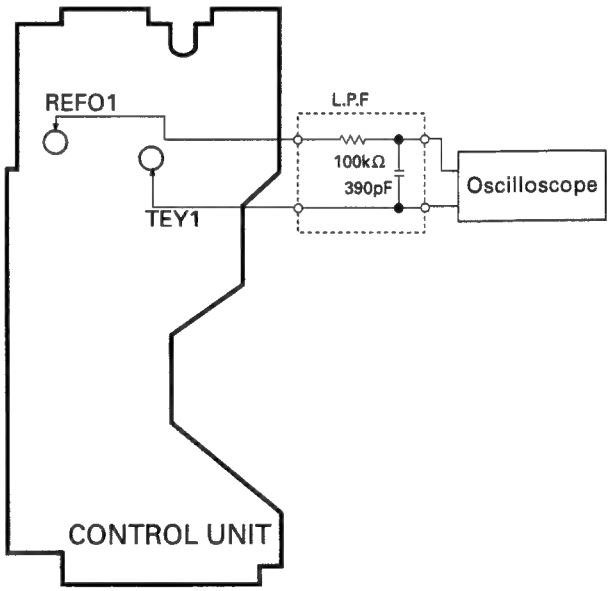


Adjustment Procedure
1.Switch the regulator on.
Select Focus EQ check in Focus mode by pressing Key **12.** And the indication 00 will change to 02.
This mode makes the laser turned off.
2.Confirm that the DC voltage of TEY1 from REFO1 is 0±25mV.
3.If not, readjust and proceed to tracking balance adjustment 2.

8 Tracking Balance Adjustment 2

·**Purpose :**
To equate the sensitivity of the F channel to that of the E channel. This needs only be done if the TE OFF-SET volume was re-adjusted in the previous step.
·**Symptoms of Mal-adjustment:**
Track search NG, poor playability, carriage runaway.

·**Measuring Equipment / Jig**	·Oscilloscope, L.P.F., GGD1057
·**Measuring Point**	·TEY1
·**Test Disc , Mode**	·ABEX TCD-784, TEST MODE
·**Adjustment Point**	·VR1002 (T.BAL VR)



Adjustment Procedure
1.Load disc and switch the regulator on.
2.Position the PU unit in the center of the disc using the **FF** & **REV** keys.
3.Close focus by pressing key **9.**
4.Observing the TEY1 waveform on the oscilloscope, adjust VR1002 until the positive and negative halves have the same amplitude (See waveform 7–9).
Check
After adjustment the TEY1 waveform should have an amplitude of 1.5±0.65 Vpp.(ABEX TCD-784)

4.2 TUNER SECTION

● Connection Diagram

NOTE:

Select C1 so that total capacity of 80pF is attained from the direction of the receiver jack.

Z: Output impedance of SSG.

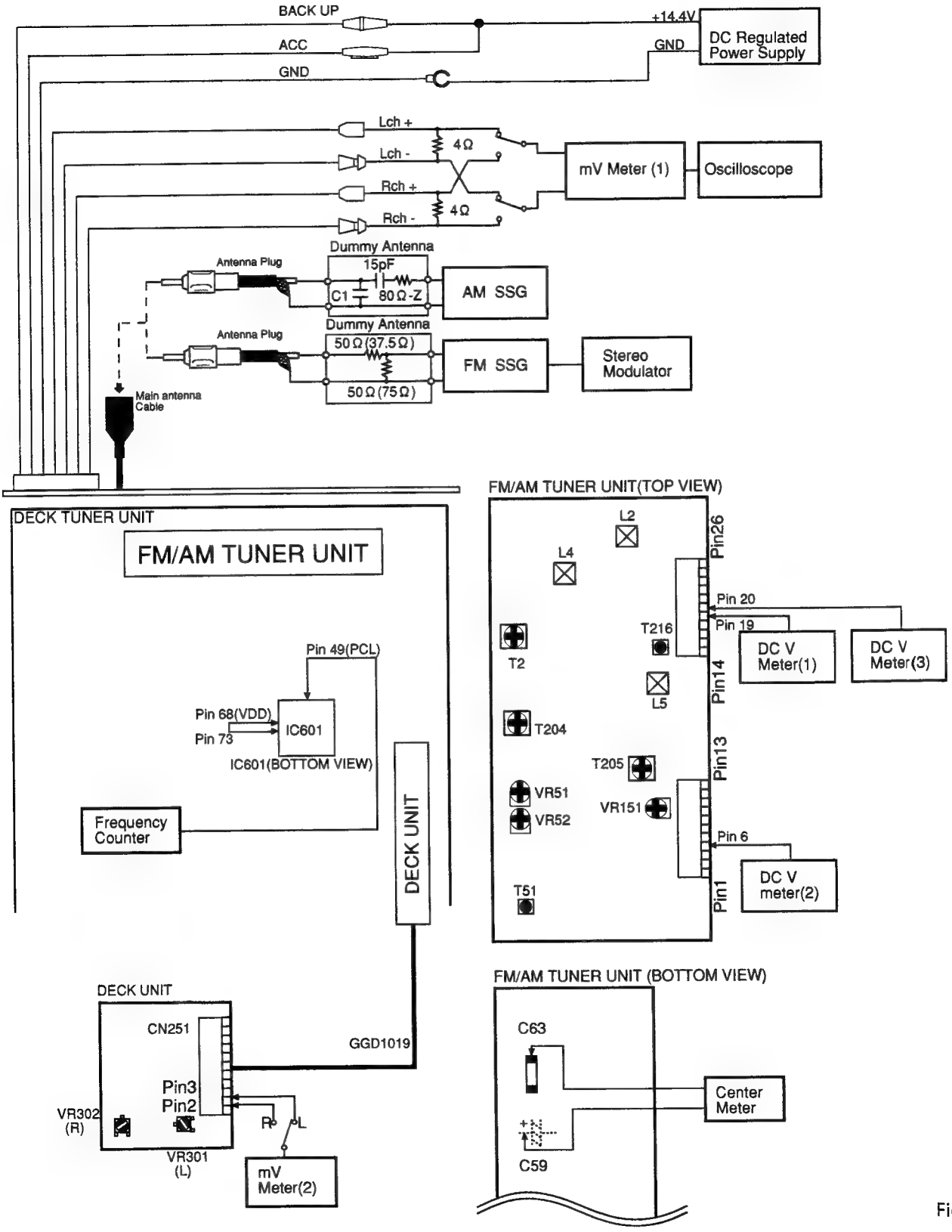


Fig.13

AM ADJUSTMENT (Tuning steps at 10kHz)

	No.	AM SSG(400Hz, 30%)		Displayed	Adjustment	Adjustment Method
		Frequency(kHz)	Level(dBμV)	Frequency(kHz)	Point	(Switch Position)
IF	1	1000	20	1000	T204,T205	mV Meter(1) : Maximum

FM ADJUSTMENT

Modulation M1:MONO MOD., 400Hz 100%(75kHz Dev.)
M2:MONO MOD., 400Hz 30%(22.5kHz Dev.)
S:STEREO MOD., 1kHz, L or R=30%(20.25kHz+7.5kHz Dev.)

NOTE:Before proceeding to further adjustments after switching power ON, let the tuner run for ten minutes to allow the circuits to stabilize.

	No.	FM SSG		Frequency(MHz)	Displayed Point	Adjustment Method (Switch Position)
		Frequency(MHz)	Level(dBf)			
TUN Volt	1	·····	·····	108.0	L5	DC V Meter(1) : 6.5V±0.1V
IF	1	98.1 M1	65	98.1	T51	Center Meter : 0
ANT,RF	1	89.9 M1	5	98.1	L2,L4	mV Meter(1) : Maximum
IFT	1	98.1 M2	5	98.1	T2	mV Meter(1) : Maximum
Soft	1	98.1 M1	65	98.1	·····	mV Meter(1) : A(0dB)(STEREO MODE)
Mute	2	98.1 M1	14	98.1	VR52	mV Meter(1) : A-3dB
ARC	1	98.1 S	39	98.1	VR151	mV Meter(1) : Separation 5dB (STEREO MODE)
SD	1	98.1 S	21	98.1	VR51	Oscilloscope(2) : Approx. 5V

DOLBY B/C NR ADJUSTMENT

No.	Test Tape	Adjustment Point	Adjustment Method (Switch Position)
1	NCT-150 (400Hz, 200nwb/m)	VR301(Lch), VR302(Rch)	mV Meter(2) : –6.0dBs(300mV)+1.5dB -0.5dB (DOLBY NR Switch : OFF)

CLOCK CONFIRMATION

Pin73 of IC601 connect to pin68(VDD) ► Frequency Counter : 1.048576MHz±24Hz

5. ERROR NUMBERS AND NEW TEST MODE

● Error Numbers And New Test Mode

● Indicating An Error Number

If the CD should fail to operate in CD multi player or if an error has taken place during the operation and resulted in an error, the player will enter into the error mode. And the cause of such error is numerically indicated.
This is armed at assisting an analysis or repair.

(1) Basic Means of Display

·With ERROR indicated in "MODE" on IP-BUS Display data, an error code is transmitted by the use of MIN and SEC. Identical data are transmitted with MIN and SEC.

·Examples of Display ERROR-XX

(2) Error Codes

Error Code	Classification	Description	Cause/Detail
10	ELECTRIC	Carriage home failure	Carriage doesn't move to or from the innermost position →Home switch failed and / or carriage immobile
11	ELECTRIC	Focus failure	Focus failed →Defects, disc upside-down, severe vibration
12	ELECTRIC	SETUP failure Subcode failure	Spindle failed to lock or subcode unreadable →Spindle defective, defect, severe vibration
14	ELECTRIC	Mirror failure	Unrecorded CD-R The disc is upside-down, defects, vibration
17	ELECTRIC	Set up failure	AGC protect failed →Defects, disc upside-down, severe vibration
30	ELECTRIC	Search time out	Failed to reach target address →Carriage / tracking defective and/or defects
A0	SYSTEM	Power failure	Power overvoltage or short circuit detected →Switching transistor defective and / or power abnormal
50	MECHANISM	An error upon ejection	MAG switch release time has time out Elevation time out when eject
60	MECHANISM	An error while putting in and out the tray	Tray in / out time has time out Tray is caught when put in
70	MECHANISM	An error upon elevation	Elevation time has time out
80	MECHANISM	An error with an empty magazine inserted	No disc is available

* Setup means a series of operations after focusing up to sound output.

● New Test Mode(aging operation and setup analysis)

The single CD player plays in normal mode. After being set up, it will display FOK (focus), LOCK (spindle), subcode, sound skip, protection against a mechanical error or the like, occurrence of an error, cause and time of an expiry, if any, (and disc number)

During the setup, the CD software operation status (internal RAM and C-point)is displayed.

(1) How to enter NEW TEST Mode

See the test mode flow chart Page 18.

(2) Relations of keys between TEST and NEW TEST Modes

Keys	Test Mode		New Test Mode	
	Regulator OFF	Regulator ON	PLAY in progress	Error Occurred, Protection Activated
BAND	Regulator ON	Regulator OFF	—	Time of occurrence / cause of error select
FF	—	FWD-KICK	TRACK UP / FF	—
REV	—	REV-KICK	TRACK DOWN / REV	—
7	—	TRACKING CLOSE	RPT	—
8	—	TRACKING OPEN	RANDOM	—
9	—	FOCUS CLOSE	ITS	—
12	To New Test Mode	Focus Mode Select	PAUSE	—

Operations, such as EJECT, CD ON/OFF, etc. are performed normally

(3) Error Cause (Error Number) Code

Error Code	Classification	Mode	Description	Cause	Detail
40	ELECTRIC	PLAY	FOK=L 100ms	Put out of focus	Scratch, Stain, Vibration, Servo defect, etc...
41	ELECTRIC	PLAY	LOCK=L 150ms	Spindle unlock	
42	ELECTRIC	PLAY	Subcode unacceptable 500ms	Failed to read subcode	
43	ELECTRIC	PLAY	Sound skipped	Last address memory operated	

(4) Indicating an Operation Status During Setup

Status No.	Description	Protection operation
01	Carriage home mode started	None
02	Carriage moving inwards	10-second time out, home switch failed
03	Carriage moving outwards	10-second time out, home switch failed
05	Carriage moving outwards	None
11	Setup started	None
12	Spindle turn/Focus search started	None
13	Waiting for focus closure (XSI=L)	Failure to close focus
10,14	Waiting for focus closure (FOK=H)	Failure to close focus
15, 16, 17	Focus closed, Tracking open	Focus disrupted
18	During focus AGC Subcode waiting	Focus disrupted
19	During tracking AGC	Disrupted focus
20	Waiting for MIRR, LOCK or subcode read Carriage closed, SPINDLE=ADAPTIVE	Focus disrupted, MIRR NG, failure to lock, failed to read subcode

(5) Example of Display.

·SET UP in progress

Single-CD

TNo.	Min	Sec
91	91	91

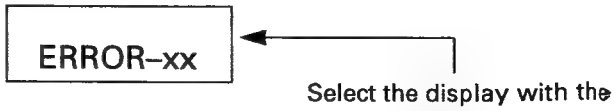
Multi-CD

TNo.	Min	Sec
11	11	11

·Operation (PLAY, SEARCH, etc.) in progress perfectly identical with that in the normal mode.

·Protection/Error upon occurrence

(a) Error number indicated



(b) Track number and absolute time indicated

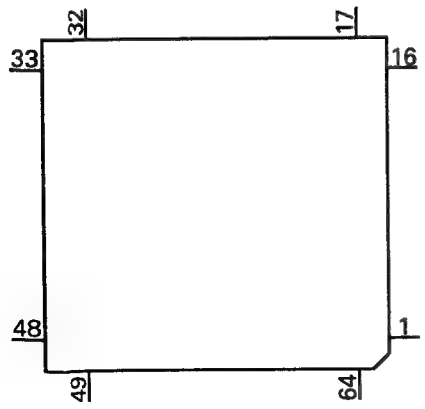
TNo.	Min	Sec
10	40	05

6. IC INFORMATION

● **Pin Functions(PD5338A)**

Pin No.	Pin Name	I/O	Format	Function and Operation
1-8	NC			Not used
9	DSPCK	O	C	DSP serial clock output
10	DSPOUT	O	C	DSP data output
11,12	NC			Not used
13	BSCK	I/O	C	Communication serial clock input/output
14	BSO	O	C	IP-BUS serial data output
15	BSI	I		IP-BUS serial data input
16	NC			Not used
17	NC			Not used
18	CNVSS	I		GND
19	$\overline{\text{RESET}}$	I		Reset Input
20	DPD	O	C	A/D converter offset calibration output
21	$\overline{\text{BRST}}$	O	C	Reset output
22	XIN	I		Crystal oscillating element connection pin
23	XOUT	O	C	Crystal oscillating element connection pin
24	VSS			GND
25	DSPMUTE	O	C	DSP mute output
26	$\overline{\text{DSPRST}}$	O	C	DSP reset control
27	$\overline{\text{DSPRDY}}$	O	C	Microcomputer I/F reception enable output
28	$\overline{\text{DSPAK}}$	I		DSP ready/busy
29	$\overline{\text{DSPRQ}}$	O	C	DSP serial request output
30	EMPIN	I		CD single de-emphasis input
31	EMPOUT	O	C	Emphasis control input control output
32	LRCKK	O	C	LRCK select control output
33-49	NC			Not used
50	$\overline{\text{BSRQ}}$	O	C	P-BUS service request output pin
51	$\overline{\text{BRXEN}}$	I/O	C	P-BUS reception enable input/output pin
52	TENBL	I		Test enable input
53	$\overline{\text{TESTIN}}$	I		Test program start input
54	DSPPW	O	C	Power supply for DSP
55	NC			Not used
56	BMUTEIN	I		Mute input when CD single is in error
57	VDD			Power supply
58	VREF	I		A/D converter reference voltage input
59	AVSS			A/D GND
60	VST	O	C	Strobe pulse output for electronic volume
61	VDT	O	C	Data output for electronic volume
62	VCK	O	C	Clock output for electronic volume
63,64	NC			Not used

*PD5338A



Format	Meaning
C	C MOS

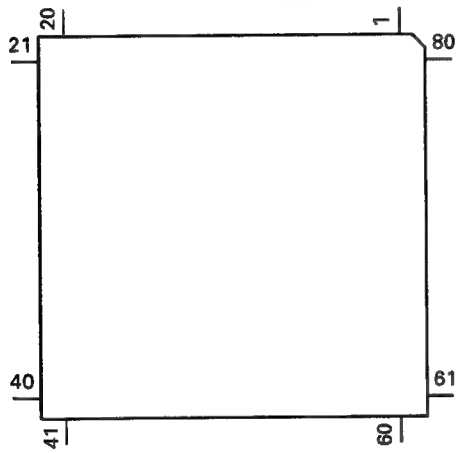
IC's marked by are MOS type.*
Be careful in handling them because they are
very liable to be damaged by electrostatic induction.

● **Pin Functions(PD4653A)**

Pin No.	Pin Name	I/O	Format	Function and Operation
1,2	NC			Not used
3	BMUTEIN	I		S-6 mute request input
4	AVSS			A/D GND
5	NC			Not used
6	MUTERQ			GND
7	AVREF1			+5V
8	RXD	I		Serial communication data input
9	TXD	O	C	Serial communication data output
10	CE	O	C	Chip enable input
11-13	NC			Not used
14	$\overline{\text{BRST}}$	O	C	IP-BUS reset output
15	$\overline{\text{BRXEN}}$	I/O	C	IP-BUS reception enable input/output
16	$\overline{\text{BSRQ}}$	I		IP-BUS communication request input
17	BSIO	I/O	C	IP-BUS serial data input/output
18	$\overline{\text{BSCK}}$	I/O	C	IP-BUS serial clock input/output
19	CDRST	O	C	Reset for CD mechanism module
20	NC			Not used
21	PLAY	O	C	MS gain select output
22	DLBYBC	O	C	Cassette mechanism dolby NR B/C select output
23	NR	O	C	Cassette mechanism NR output
24	SC1	O	C	Cassette mechanism sub motor control output
25	SC2	O	C	Cassette mechanism sub motor control output
26	CM	O	C	Cassette mechanism capstan motor control output
27	MSIN	I		Cassette mechanism MS sense input
28	DIRO	O	C	Cassette mechanism head F/R select output
29	$\overline{\text{MTLSW}}$	I		Cassette mechanism metal sense input
30	LOADSW	I		Cassette mechanism tape loading input
31	POS	I		Cassette mechanism position sense input
32	RES	I		Cassette mechanism reverse end sense input
33	VSS			GND
34	NES	I		Cassette mechanism normal end sense input
35	$\overline{\text{STBY}}$	O	C	Cassette mechanism driver stand-by output
36	FLEX	O	NH	Sound tune-up IC control
37	$\overline{\text{SHELL}}$	I		Cassette mechanism shell detection input
38	TUNANT	O	NH	Auto antenna control output
39	NC			Not used
40	TELIN	I		Telephone mute input
41	SYSPWR	O	C	System power control
42	FLPILM	O	C	Inside flap illumination control
43	NC			Not used
44	ASENBO	O	C	Slave power supply control output
45	PEE	O	C	Beep tone output
46	$\overline{\text{MUTE}}$	O	C	System mute
47	FLPPWR	O	C	Flap power
48	NC			Not used
49	PCL	O	C	For clock adjustment
50	FM/AM	O	C	FM/AM power select output
51	MONO	O	C	Forced mono output
52	NC			Not used
53	MODEL	I		Model discriminate
54,55	SOR0,1	O	C	Source select output 0,1
56	TX	O	C	IP BUS data output
57	RX	I		IP BUS data input
58	$\overline{\text{IPPW}}$	O	C	Power supply control output for IP BUS interface IC
59	SD	I		SD signal input
60	$\overline{\text{RESET}}$			Reset
61	$\overline{\text{MSSENS}}$	I		Music sense

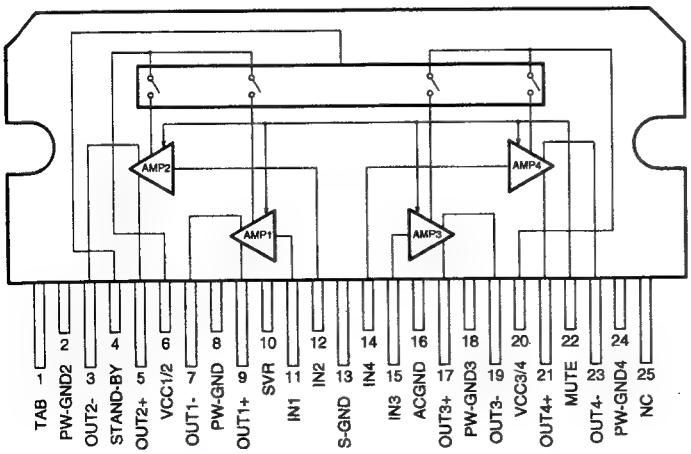
Pin No.	Pin Name	I/O	Format	Function and Operation
62	$\overline{\text{BSENS}}$	I		Back up power sense input
63	$\overline{\text{ASENS}}$	I		ACC power sense input
64	PDI	I		PLL data input
65	PDO	O	C	Data output for PLL IC
66	PCK	O	C	PLL clock output
67	PCE	O	C	Chip enable output for PLL IC
68	VDD			Power supply
69	XO	O	C	Crystal oscillator connection pin
70	XI	I		Crystal oscillator connection pin
71	IC			GND
72	NC			Not used
73	TESTIN	I		Test program mode input
74	AVDD	I		Positive power supply terminal for analog circuit
75	NC			Not used
76	SL	I		Signal level input
77	FLPCLS	O	C	Flap motor close output
78	FLPOPN	O	C	Flap motor open output
79	$\overline{\text{FOPNSW}}$	I		Auto flap open SW sense
80	$\overline{\text{FCLSSW}}$	I		Auto flap close SW sense

*PD4653A



Format	Meaning
C	C MOS
NH	High resistivity N channel open drain

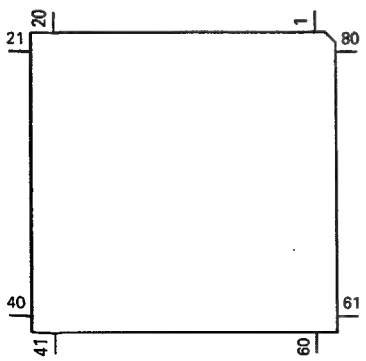
PAL003A



● **Pin Functions(PD4655B)**

Pin No.	Pin Name	I/O	Format	Function and Operation
1	BATT	O	C	Back up voltage detect
2	AVSW	O	C	AD power supply switch
3	NC			Not used
4	AVSS			A/D GND
5,6	NC			Not used
7	AVREF1			GND
8	DSPIN	I		DSP serial data input
9	KEYOUT	O	C	Key data output
10,11	NC			Not used
12	LDSO	O	C	LCD driver communication data output
13	$\overline{\text{LSCK}}$	O	C	LCD driver communication clock output
14	$\overline{\text{SPCS2}}$	O	C	Communication chip select of the spectrum analyzer IC
15	SPCWR	I/O	C	Communication read/write control of the spectrum analyzer IC
16	SPCI	I		Communication data input of the spectrum analyzer IC
17	SPCO	O	C	Communication data output of the spectrum analyzer IC
18	SPCK	I/O	C	Communication clock output of the spectrum analyzer IC
19	FUNC			Not used
20	$\overline{\text{SPRST}}$	O	C	Reset output for spectrum analyzer IC
21	$\overline{\text{SPCS1}}$	O	C	Communication chip select of the spectrum analyzer IC
22-32	NC			Not used
33	VSS			GND
34	$\overline{\text{EJECT}}$	I		Eject key input
35	$\overline{\text{FLPOPCL}}$	I		Flap open key input
36-39	CONT0-3	O		Contrast adjustment output
40,41	NC			Not used
42	LA_D	O	C	LCD driver communication address/data select
43	LLATC	O	C	LCD driver communication latch output
44	LPOW	O	C	LCD power source control
45	BKLT	O	C	Back-light control
46-59	NC			Not used
60	$\overline{\text{RESET}}$	I		Reset input
61	$\overline{\text{REMIN}}$	I		Remote control signal input
62	TESTIN	I		Test program mode input
63	CE	I		Chip enable input
64-67	NC			Not used
68	VDD			Power supply
69	XO	O	C	Crystal oscillator connection pin
70	XI	I		Crystal oscillator connection pin
71	IC			GND
72	NC			Not used
73	NC			GND
74	AVDD			Positive power supply terminal for analog circuit
75	AVREF0			Reference power supply
76-80	KDT0-4	I		Key input

*PD4655B



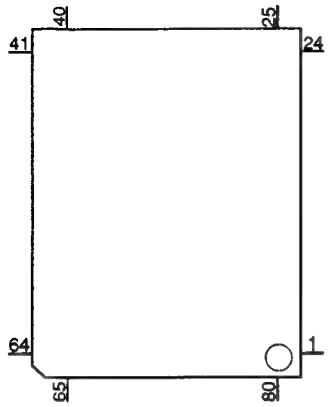
Format	Meaning
C	C MOS

● **Pin Functions(LC83015JE)**

Pin No.	Pin Name	I/O	Format	Function and Operation
1-6	P0-P5	I/O	C	Input/output port
7	ASI1	I		Audio data serial input 1
8	BCK1	I		Bit clock input
9	FS384I	I		384fs or 512fs input
10	LRCKI	I		L/R channel detect signal input
11	ASI2	I		Audio data serial input 2
12	BCK2	I		Bit clock input
13	VDD1			+5V power supply
14-17	TEST1-4	I		Test terminal
18	VSS1			GND
19	TEST5	I		Test terminal
20	$\overline{RAS}$	O	C	RAS signal output when DRAM access
21	$\overline{CAS}$	O	C	CAS signal output when DRAM access
22	$\overline{DWRT}$	O	C	Data write signal output when memory access
23	$\overline{DREAD}$	O	C	Data read signal output when memory access
24	$\overline{CE/CS}$	O	C	Chip enable signal output for SRAM
25-32	D7-D0	I/O	C	Data input/output
33	VSS2			GND
34-50	A0-A16	O	C	Address output
51	VDD2			+5V power supply
52	OSC1	I		Crystal input
53	OSC2	O	C	Crystal output
54	VSS3			GND
55	FS384O	O	C	384fs or 512fs output
56	FS192O	O	C	192fs or 256fs output
57	FS128O	O	C	128fs output
58	FS64O	O	C	64fs or 32fs output
59	FS32O	O	C	32fs or 16fs output
60	LRCKO	O	C	1fs output
61	AOWCK	O	C	2fs or 1fs output
62	ASO	O	C	Audio data serial output 1
63	AOTDF1	O	C	Audio data serial output 2
64	AOTDF2	O	C	Audio data serial output 3
65	SI	I		Serial data input
66	SICK	I		Serial clock input for SI
67	$\overline{SIRQ}$	I		Request signal input
68	$\overline{SIAK}$	O	C	Output terminal which indicates serial input now being conducted
69	$\overline{SRDY}$	I		Ready signal input
70	SO	O	C	Serial data output
71	SOCK	I		Serial clock input for SO
72	$\overline{SORQ}$	I		Request signal input
73	$\overline{SOAK}$	O	C	Output terminal which indicates serial output now being conducted
74	VSS4			GND
75	$\overline{RES}$	I		Reset
76	$\overline{INT}$	I		Interrupt request input
77	VDD3			+5V power supply
78	$\overline{SELC}$	I		System clock switch
79	$\overline{SACK1}$	I		Frequency divider output switch
80	$\overline{SACK2}$	I		FS output clock switch

Format	Meaning
C	C MOS

*LC83015JE



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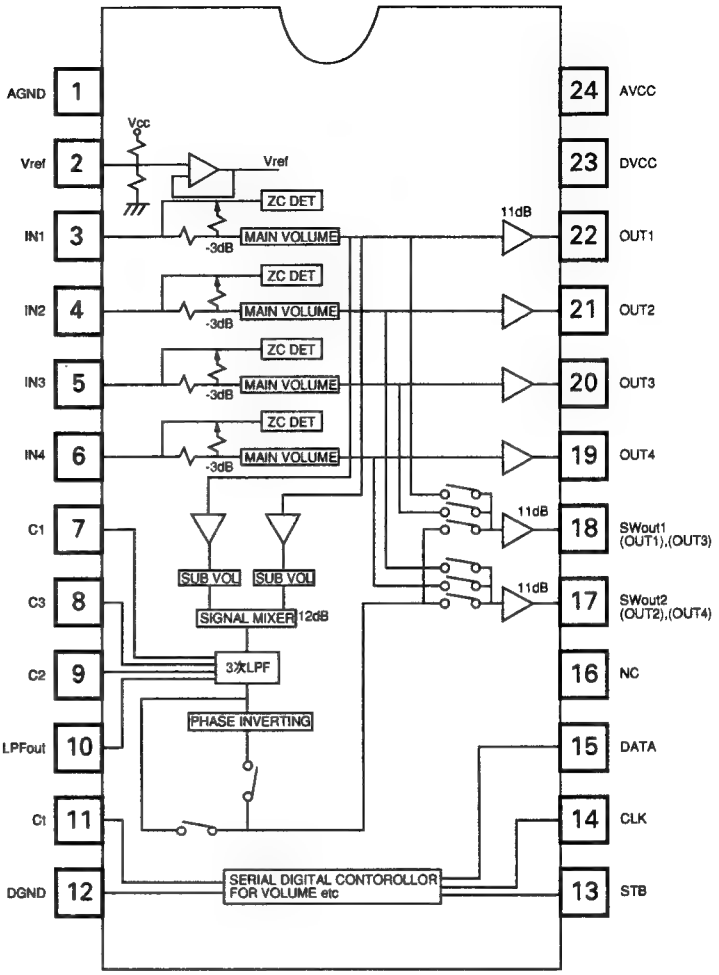

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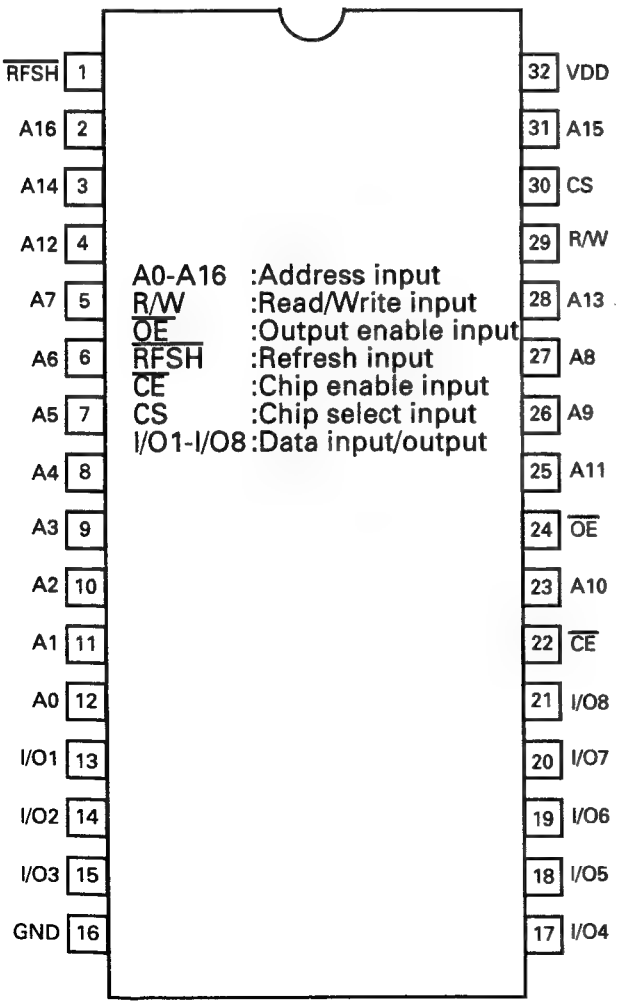

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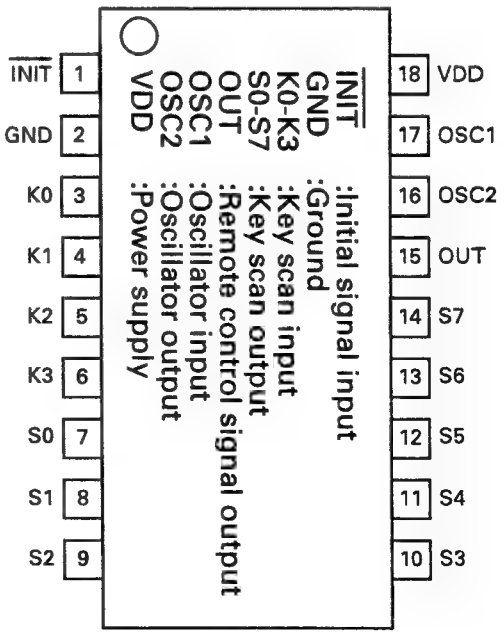

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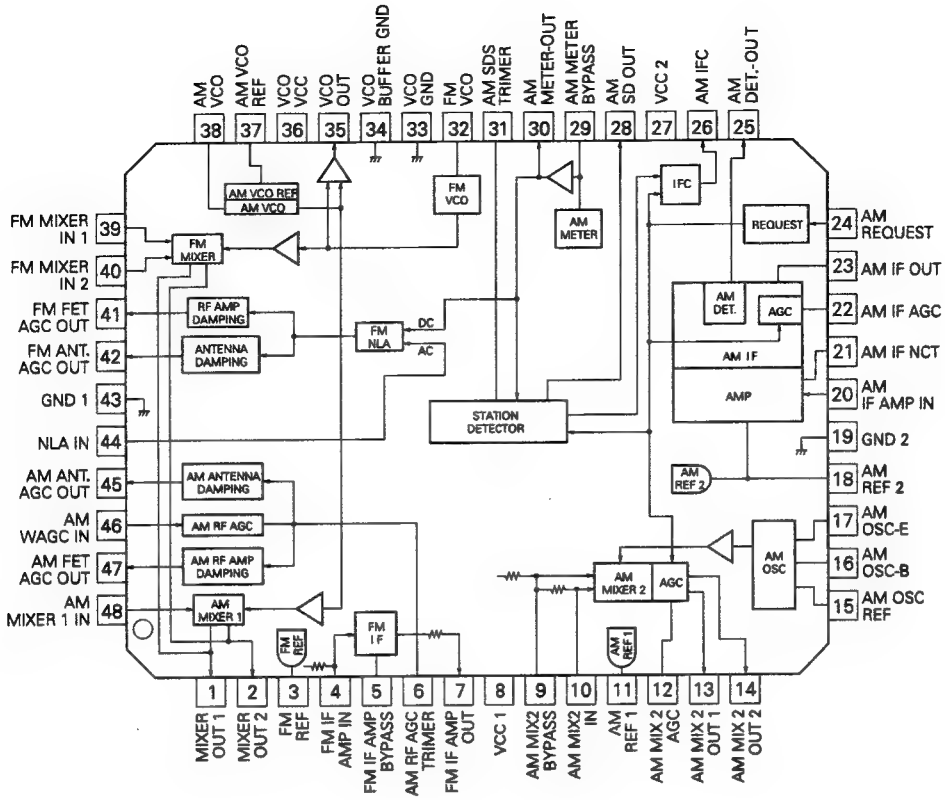

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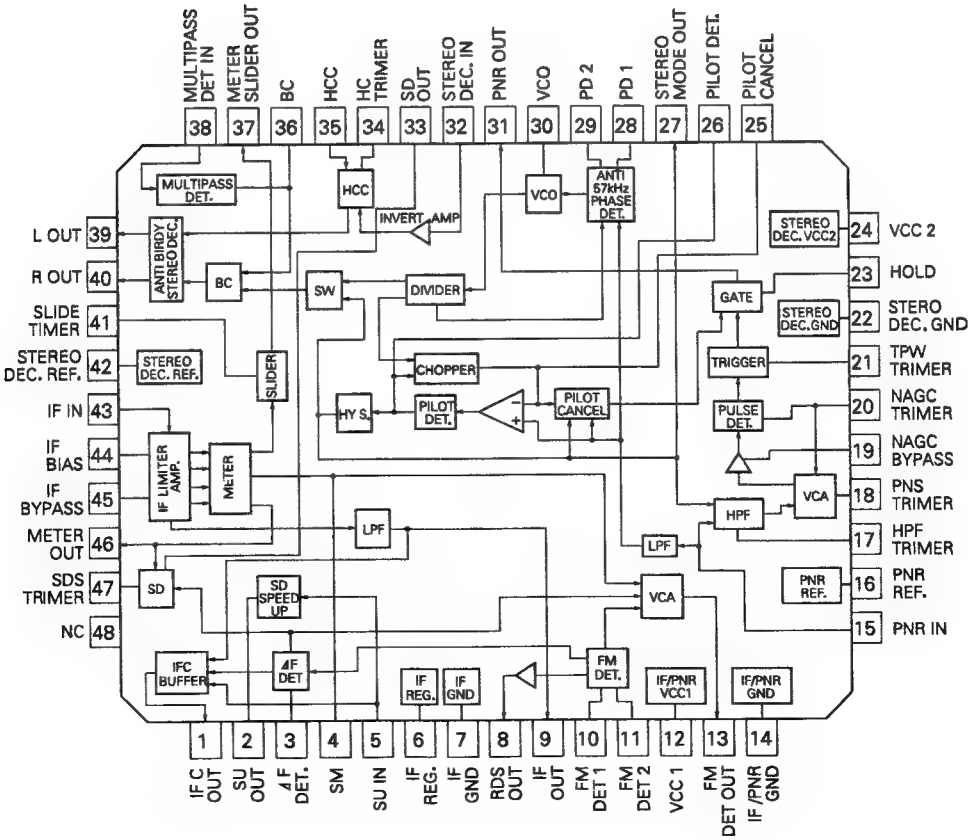

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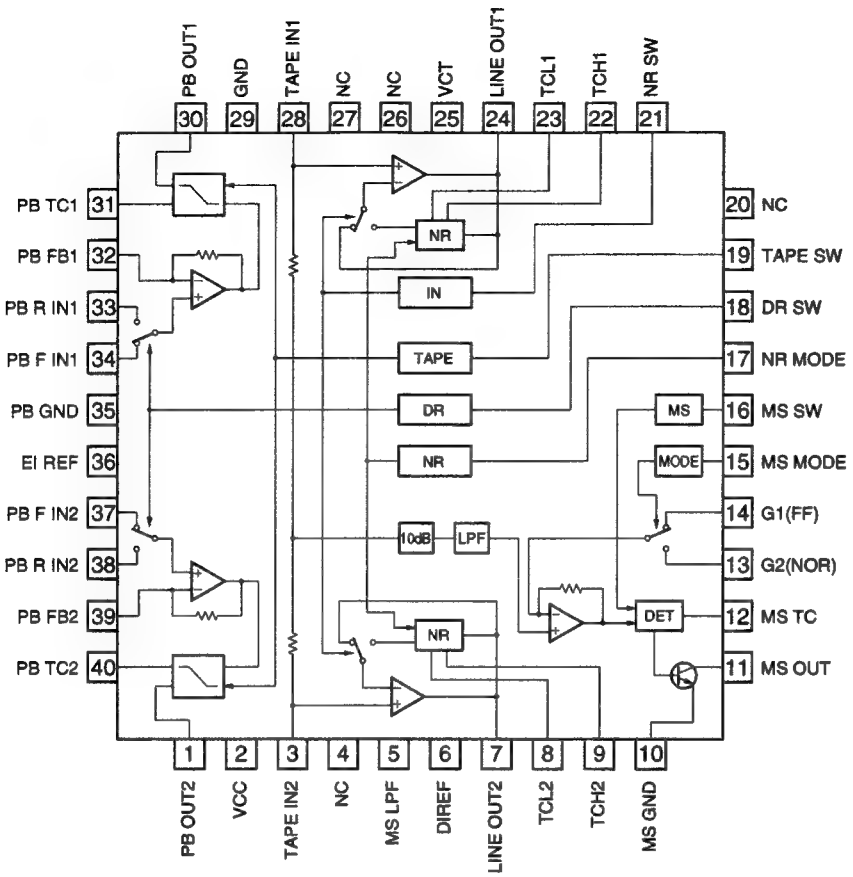

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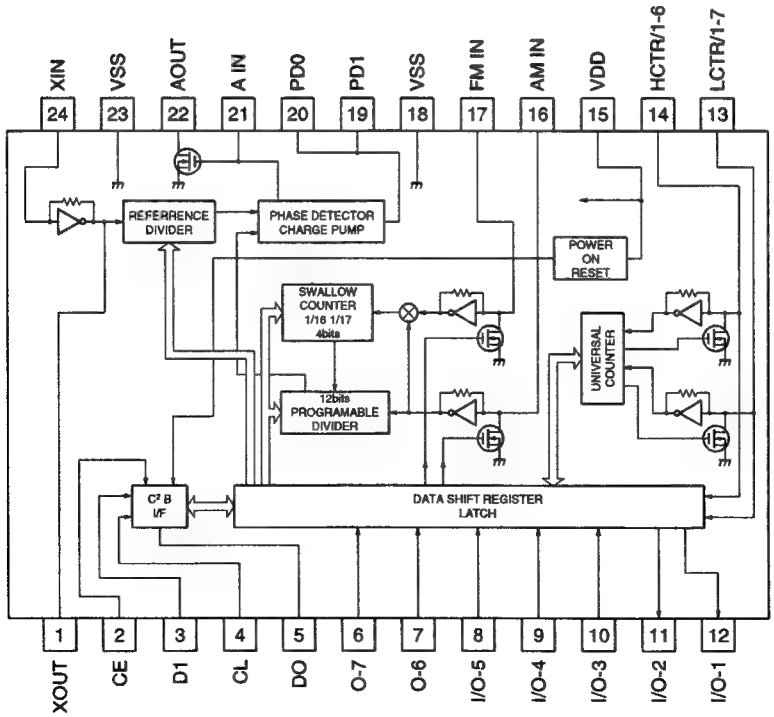

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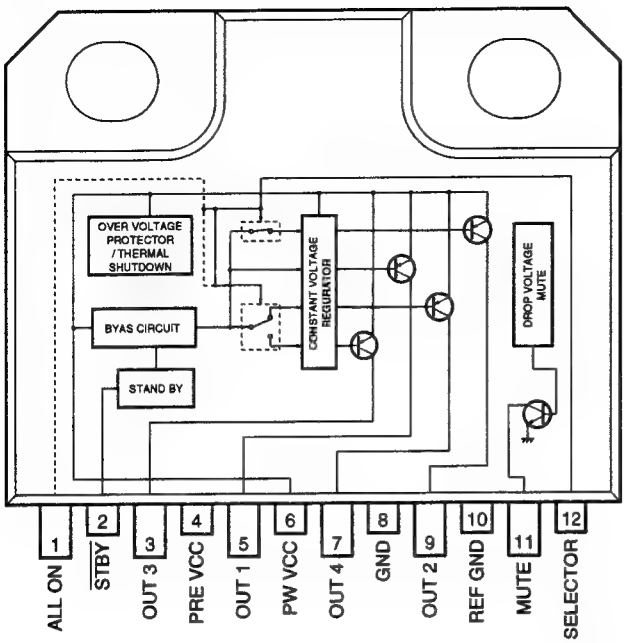

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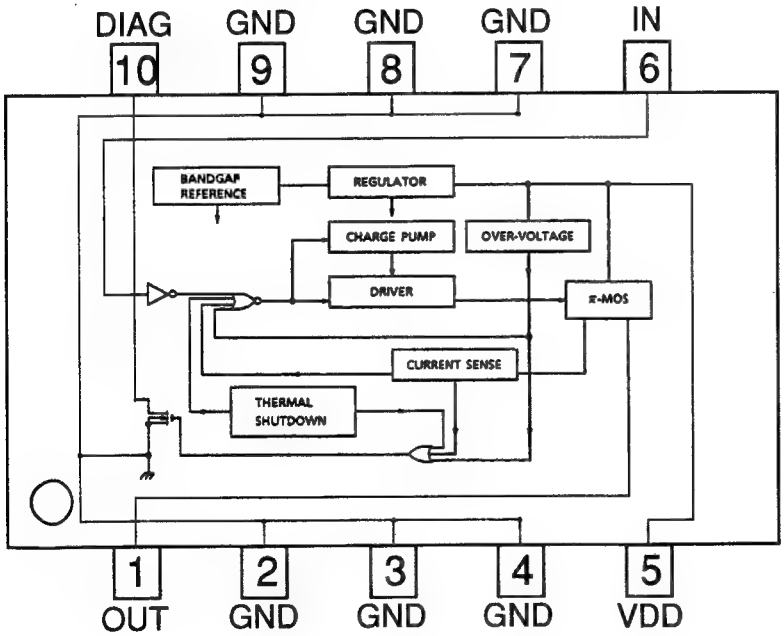
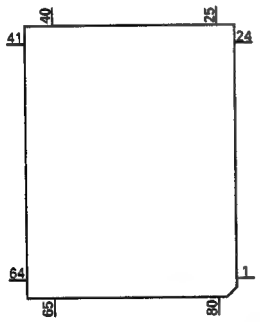


● **Pin Functions(UPD63700GF1)**

Pin No.	Pin Name	I/O	Function and Operation
1	D.GND		Logic circuit GND
2	RFOK	O	RFOK detection signal output terminal
3	MIRR	O	MIRR detection signal output terminal
4	TBC	I	Tracking filter bank switching terminal
5	HOLD	I	Hold control signal input terminal
6	D.VDD		VDD for logic circuit
7	$\overline{RST}$	I	System reset
8	AO	I	Control signal distinguishing data from microcomputer
9	$\overline{STB}$	I	Signal latching serial data inside LSI
10	$\overline{SCK}$	I	Clock input terminal for serial data input and output
11	SO	O	Serial data and status signal output
12	SI	I	Serial data input
13	TM2	I	Double speed playback control terminal
14	D.GND		Logic circuit GND
15	TEST	I	Test terminal
16	STBY	I	Stand-by input terminal
17	CTLV	I	Control terminal for clock generation VCO used by digital PLL in double speed playback mode
18	POUT	O	Output terminal for phase comparison between EFM signal and bit clock
19	D.GND		Logic circuit GND
20	VCO	I	Inverter input
21	$\overline{VCO}$	O	Inverter output
22	D.VDD		VDD for logic circuit
23	PLCK	O	Bit clock monitor terminal
24	LOCK	O	"H" when synchronization signal and frame counter output coincide at EFM demodulator
25	WFCK	O	Signal issuing one-frame period by bit clock dividing signal
26	RFCK	O	Oscillation clock divider signal, output pin for signal giving 1-frame sync
27	C4M	O	Output terminal for signal having four the frequency of LRCK
28	C16M	O	Oscillation clock output terminal
29	D.GND		Logic circuit GND
30	XTAL	I	Oscillation continuation terminal
31	$\overline{XTAL}$	O	Oscillation continuation terminal
32	D.VDD		VDD for logic circuit
33	SCKO	O	Clock output terminal for audio serial data
34	LRCK	O	Signal distinguishing between left and right channel DOUT terminal output
35	DOUT	O	Serial audio data output terminal
36	TX	O	Digital audio interface data output terminal
37	FLAG	O	Flag signal indicating that the current audio data output of incorrectable data
38	EMPH	I/O	Emphasis information input/output
39	WDCK	O	Output terminal for signal having double the frequency of LRCK
40	C2D3	O	Output terminal indicating C2 error correction status
41	SFSY	O	Signal indicating subcode one-frame synchronization
42	SBSY	O	Signal indicating head of subcode block
43	SBSO	O	Subcode data output terminal
44	SBCK	I	Subcode data read clock input terminal
45	D.GND		Logic circuit GND
46,47	C1D1,C1D2	O	Output terminal indicating C1 error correction status
48,49	C2D1,C2D2	O	Output terminal indicating C2 error correction status
50	T4	I	Selects between focus and tracking modulation mode
51	T5	I	Selects motor modulation mode
52	T6	I	Sets focus PWM output mode
53	T7	I	Sets tracking PWM output mode
54	D.VDD		VDD for logic circuit
55	MRD	O	PWM negative output terminal for the spindle loop filter

Pin No.	Pin Name	I/O	Function and Operation
56	MFD	O	PWM positive output terminal for the spindle loop filter
57	SRD	O	PWM negative output terminal for the thread loop filter
58	SFD	O	PWM positive output terminal for the thread loop filter
59	D.GND		Logic circuit GND
60	TRD	O	PWM negative output terminal for the tracking loop filter
61	TFD	O	PWM positive output terminal for the tracking loop filter
62	FRD	O	PWM negative output terminal for the focus loop filter
63	FFD	O	PWM positive output terminal for the focus loop filter
64	D.VDD		VDD for logic circuit
65	OUTSEL	I	Sets PWM output mode for the motor system
66	TEC1	I	Tracking error input terminal
67	TEC0	I	Tracking error input terminal
68	A.VDD		VDD for analog circuit
69,70	VR2,VR1	I	A/D converter input
71	TE	I	Tracking error input terminal
72	FE	I	Focus error input terminal
73	RFB	I	RFB signal input terminal
74	RFP	I	RFP signal input terminal
75	A.GND		Analog circuit GND
76	REFOUT	O	A/D converter midpoint voltage output terminal inside LSI
77	RFI	I	RF signal input terminal for EFM comparator
78	ASI	I	Level comparing input for RF signal comparison
79	EFM	O	EFM signal output terminal
80	A.VDD		VDD for analog circuit

*UPD63700GF1

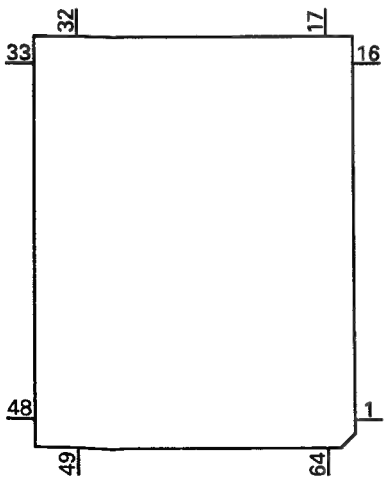


● **Pin Functions(PD4690A)**

Pin No.	Pin Name	I/O	Format	Function and Operation
1	NC			Not used
2	XRST	O	C	CD LSI reset output
3–5	CBNK2-0	O	C	DSP bank for compressor set up output
6	DRST	O	C	DSP bank for compressor reset output
7	HOME	I		Home position detector input
8	CLAMP	I		Disc clamp sense input
9	VSS			GND
10	LATCH	O	C	Latch output
11	EJECT	O	C	Loading motor EJECT control
12	LOAD	O	C	Loading motor LOAD control
13	CONT	O	C	Servo driver power supply control
14	NC			Not used
15	CDMUTE	O	C	CD mute output
16	NC			Not used
17	ADENA	O	C	A/D reference voltage output

Pin No.	Pin Name	I/O	Format	Function and Operation
18–23	NC			Not used
24	VSS			GND
25	NC			Not used
26	DSET	O	C	Disc set indicator light output
27–30	NC			Not used
31	BRXEN	I/O	C	Reception enable input/output
32	BSRQ	O	C	IP-BUS serial pole request output
33	VDCONT	O	C	VD control output
34	CD5VON	O	C	CD +5V power supply control output
35	$\overline{\text{RESET}}$	I		Reset input
36	TXARI	I		Set up of TX output select input
37	$\overline{\text{EJSW}}$	I		Eject key input(Not used)
38	$\overline{\text{BRST}}$	I		Reset input
39	COMP	I		Compression select input
40	VDD			Power supply
41	X2	O	C	Crystal oscillator connection pin
42	X1	I		Crystal oscillator connection pin
43	VSS			GND
44	NC			Not used
45	TESTIN	I		Test program start input
46	VSS			A/D GND
47	TEMP	I		Temperature detector
48	VDSENS	I		Over voltage sense input
49	EJTD	I		Disc eject position sense input
50	DINC	I		Disc insert sense input
51	NC			Not used
52	FOK	I		FOK signal input
53	MIRR	I		Mirror detector input
54	LOCK	I		Spindle lock detector input
55	AVDD			A/D analog power supply
56	AVREF	I		A/D converter reference voltage
57	XSI	I		LSI data input
58	XSO	O	NM	LSI data output
59	XSCK	O	NM	LSI clock output
60	XSTB	O	C	CD LSI strobe output
61	XA0	O	C	Control signal distinguishing data from microcomputer
62	VSS			GND
63	BDATA	I/O	C	IP–BUS serial data input/output
64	BSCK	I/O	C	IP-BUS serial clock input/output

*PD4690A



Format	Meaning
C	C MOS
NM	Middle resistivity N channel open drain

7. ELECTRICAL PARTS LIST

NOTES:

- Parts whose parts numbers are omitted are subject to being not supplied.
- The part numbers shown below indicate chip components.

Chip Resistor

RS1/○S○○○J,RS1/○○S○○○J

Chip Capacitor (except for CQS.....)

CKS....., CCS....., CSZS.....

=====Circuit Symbol & No. Part Name=====										Part No.
Unit Number : CWE1365										
Unit Name : FM/AM Tuner Unit										
MISCELLANEOUS										
IC	1									PA2025A
IC	2									PA2026A
Q	1									FET 3SK263
Q	2									2SC2712
Q	3									DTC124EU
Q	51									DTC124TU
Q	52									2SC4098
Q	190									2SA1586
Q	191	202								2SC2712
Q	201									2SK932
D	1									1SV251
D	2	3	4							KV1410-F1
D	5									MA151WK
D	6	7								RD39JS
D	8	201								MA157
D	191									MA157
D	202									MA110
D	203									SVC253
L	1									Inductor LCTBR12K2125
L	2	4								Coil CTC1126
L	3									Coil CTC1124
L	5									Coil CTC1125
L	51									Ferri-Inductor LAU2R2K
L	52									Ferri-Inductor LAU150K
L	201									Ferri-Inductor LAU4R7K
L	203									Ferri-Inductor 1mH CTF1026
L	204									Ferri-Inductor LAU151K
L	206									Inductor LAU3R3J
L	207									Ferri-Inductor LAU330K
T	2									Coil CTE1077
T	51									Coil CTC1119
T	204									Coil CTE1074
T	205									Coil CTE1075
CF	51	52	201							Ceramic Filter CTF1290
CF	202									Ceramic Filter CTF1300
X	151									Ceramic Resonator 456kHz CSS1308
X	201									Crystal Resonator 10.26MHz CSS1111
VR	51									Semi-fixed 22kΩ(B) CCP1208
VR	52									Semi-fixed 68kΩ(B) CCP1211
VR	151									Semi-fixed 10kΩ(B) CCP1206
RESISTORS										
R	1	3	16	20						RS1/16S223J
R	2									RS1/16S331J
R	4	14								RS1/16S563J
R	6									RS1/16S123J
R	8									RS1/16S271J
R	9									RS1/16S153J
R	10									RS1/16S682J
R	11									RS1/16S474J
R	13									RS1/16S104J
R	15	103	217							RS1/16S563J
R	17	21	206							RS1/16S332J
R	18									RS1/16S223J
R	19									RS1/16S821J
R	22									RS1/16S560J
R	32									RS1/16S682J
R	51									RS1/16S391J
R	52									RS1/16S182J
R	53									RS1/16S751J
R	54									RS1/16S223J
R	55	102	209	222						RS1/16S822J
R	56									RS1/16S272J
R	71									RS1/16S182J
R	72									RS1/16S821J
R	73									RS1/16S331J
R	74									RS1/16S681J
R	101									RS1/16S224J
R	104									RS1/16S822J
R	153	159	161							RS1/16S103J
R	154									RS1/16S123J
R	155									RS1/16S822J
R	156									RS1/16S822J
R	157									RS1/16S562J
R	158									RS1/16S682J
R	160	190								RS1/16S473J
R	191	207	299							RS1/16S225J
R	192									RS1/16S221J
R	193									RS1/16S224J
R	194	298								RS1/16S225J
R	203									RS1/16S102J
R	204	213								RS1/16S222J
R	205									RS1/16S333J
R	208									RS1/16S752J
R	214	218								RS1/16S333J
R	215	224								RS1/16S330J
R	216									RS1/16S152J
R	220									RS1/16S100J
R	221									RS1/16S273J
R	239									RS1/16S103J
CAPACITORS										
C	1									CCS1CH220J50
C	2	11	19	29	51	52	62	63	164	209 CKSYB103K50
C	3									CCS1CH470J50
C	4									CCS1RH270J50
C	5									CCS1RH080D50
C	6									CCS1RH040C50
C	8									CKSYB102K50
C	9									CCS1CH470J50
C	10									CCS1RH100D50
C	12	13								CCS1CH050D50

=====Circuit Symbol & No. Part Name=====	Part No.
C 14 20 21 151 227 228	CKSRYB103K50
C 15 55 58 101 161	CKSQYB104K16
C 16	CCSRCH020C50
C 17	CCSRRH100D50
C 18	CCSRRH090D50
C 23 56 104 162	CEA010M50LL
C 24 106 213 236	CKSRYB223K25
C 26 28 212	CEA330M10LL
C 27	CKSRYB103K50
C 31 73	CKSRYB333K16
C 32	CKSRYB222K50
C 34	CKSRYB682K50
C 53 54	CCSRCH270J50
C 57 64 66	CCSRCH101J50
C 59	CEAR47M50LL
C 61	CEAR22M50LL
C 72	CKSRYB102K50
C 102 154 156 163 203 219 238	CKSQYB473K16
C 103	CKSRYB222K50
C 105 206	CKSRYB222K50
C 152 153	CKSRYB333K16
C 155	CEAR68M50LL
C 158	CEA100M16LL
C 159	CCSRCH271J50
C 160	CKSYB105K16
C 190	CKSRYB223K25
C 191	CEA150M10LS
C 201	CCSRCH471J50
C 204	CCSRCH151J50
C 205 221	CCSRCH680J50
C 207	CEA101M16LL
C 208	CKSRYB102K50
C 210 215 220 223 225 235	CKSRYB103K50
C 211	CKSYB105K16
C 214 230	CKSRYB472K50
C 216	CCSRCH100D50
C 217	CCSRCH221J50
C 218	CEA4R7M35LL
C 222	CCSRCH150J50
C 224	CCSRUJ181J50
C 226	CEA4R7M35LL
C 229	CEAR68M50LL
C 232	CCSRTH220J50
C 233	CKSRYB332K50
C 234	CEA220M6R3LL
C 239	CKSRYB332K50
C 240	CKSRYB103K50

Unit Number : CWM4451
Unit Name : DSP Amp Unit

MISCELLANEOUS

IC 1401	NJM4558MD
IC 1402	AK5340-VS
IC 1501	PAL003A
IC 1502	PM0009AM
IC 1601	LC83015JE
IC 1602	TC518129CFWI
IC 1603	PD5338A
IC 1604	TC74HC393AF
IC 1605	TC74HC175AF
IC 1606	TC74HC158AF
IC 1607	S-80722AN-DK
IC 1608	L780S05
IC 1609 1610	YSF224BM
IC 1611	TC7S08F
IC 1701 1702	TC9268F

=====Circuit Symbol & No. Part Name=====	Part No.
IC 1703 1704	TA2063F
IC 1801 1802	TPD1018F
Q 1501 1510 1604 1804 1810	DTC124ES
Q 1502	DTA124ES
Q 1503 1504	DTC314TK
Q 1505 1506 1507 1508	DTC314TK
Q 1509	DTA114ES
Q 1511 1512 1513 1514 1515 1516	DTC314TK
Q 1601	DTC124EK
Q 1602	DTA114EK
Q 1603	2SD2396
Q 1801 1813	2SD1760F5
Q 1802	DTC114TS
Q 1803 1805 1808 1809 1814	2SC2458
Q 1806	2SA1797
Q 1807 1811	2SA1048
Q 1812	2SD1684
D 1501 1502 1503 1601 1602 1603 1604 1607 1608 1609	1SS133
D 1605	HZS9LC1
D 1606 1801 1802 1809 1815 1816 1817	ERA15-02VH
D 1804 1808 1810 1811	1SS133
D 1805	1SS133
D 1806	HZS6LC3
D 1807	HZS7LC2
D 1812	HZS4LLB
D 1813	MA3068M
D 1814	MA3091M
D 1818	HZS16L1
L 1401 1402 1601 1603 Ferri-Inductor	LAU2R2K
L 1602 1609 1611 1701 Ferri-Inductor	LAU2R7K
L 1604 1605 1606 1612 Ferri-Inductor	LAU2R2K
L 1613 1802 Ferri-Inductor	LAU2R2K
L 1614 1615 Ferri-Inductor	LAU2R7K
L 1617 Inductor	CTF1305
L 1702 1703 1704 Ferri-Inductor	LAU2R7K
L 1706 Ferri-Inductor	LAU2R7K
L 1708 1709 1710 Ferri-Inductor	LAU2R7K
L 1801 Choke Coil 600H	CTH1170
X 1601 Crystal Resonator 8.000MHz	CSS1107
X 1701 Crystal Resonator 16.9344MHz	CSS1067
FU1401 1701 IC Protector 0.6A	ICP-N15
EF1601	CCG1070

RESISTORS

R 1401 1403 1407 1508 1812 1826	RS1/16S223J
R 1402 1404 1405 1406 1408 1515 1516 1816	RS1/16S223J
R 1409 1417 1418	RS1/16S470J
R 1410	RS1/16S470J
R 1413 1414 1416 1422 1423 1528 1608 1626	RS1/16S102J
R 1415 1602 1604 1616 1617 1618 1619 1620 1621 1622	RS1/16S102J
R 1419	RS1/16S510J
R 1420 1421	RS1/16S472J
R 1501 1504 1823 1825 1836	RS1/16S103J
R 1502	RS1/16S330J
R 1503 1662 1803	RS1/16S103J
R 1505	RS1/16S391J
R 1506	RS1/16S391J
R 1507	RS1/16S223J
R 1509 1510	RS1/16S391J
R 1511 1512	RS1/16S223J
R 1513 1514	RS1/16S391J
R 1517 1518 1521 1522	RD1/4PU102J
R 1529 1649 1807 1808 1815	RS1/16S473J
R 1531 1532	RS1/16S391J

=====Circuit Symbol & No. Part Name=====	Part No.
R 1533 1534 1535 1536	RS1/16S391J
R 1601 1606 1611 1612	RA4C102J
R 1609 1610	RA3C102J
R 1613 1614 1615 1627 1636 1637 1638 1644 1802	RS1/16S473J
R 1623	RS1/16S102J
R 1625 1629 1634 1643 1648 1650 1651 1652 1701 1814	RS1/16S102J
R 1628 1630 1632 1639 1640 1642	RS1/16S221J
R 1631 1633 1645 1646	RS1/16S221J
R 1635 1653 1654 1655 1656 1657 1663 1664 1821	RS1/16S102J
R 1647	RS1/16S124J
R 1660	RD1/4PU471J
R 1661	RD1/4PU221J
R 1665 1666	RD1/4PU102J
R 1702	RS1/16S105J
R 1805	RS1/16S101J
R 1806	RS1/16S222J
R 1809 1810	RS1/16S222J
R 1813	RD1/4PU222J
R 1817	RS1/16S102J
R 1818	RS1/16S183J
R 1819 1820	RS1/16S472J
R 1827	RD1/4PU471J
R 1828 1829 1833 1834 1841 1842	RD1/4PU680J
R 1830	RS1/16S222J
R 1831	RS1/16S101J
R 1832	RS1/10S182J
R 1835	RS1/16S683J
R 1840	RS1/16S333J

CAPACITORS

C 1401 1402	CEA2R2M35NPLL
C 1403 1404	CEA2R2M50LL
C 1405	CCSRCH820J50
C 1406	CCSRCH820J50
C 1407 1408 1409 1508 1511 1512 1513 1514 1515 1516	CEA100M16LL
C 1410	CEWAR221M6R3
C 1412	CEWAR100M16
C 1413 1807	CKSQYB473K16
C 1414 1418 1517 1518 1519 1520 1606	CEA4R7M35LL
C 1415 1416 1417 1420 1618 1628	CKSRYB103K50
C 1419 1509 1525 1531 1706 1720	CKSQYB104K16
C 1421	CKSRYB221K50
C 1422	CEWAR221M6R3
C 1423	CEWAR010M50
C 1501 1502 1503 1504	CEAR22M50LL
C 1505	CEA330M10LL
C 1506 1617 1813	CEA010M50LL
C 1507	CEWAR010M50
C 1510 4700 μF/16V	CCH1188
C 1521 1613 1635 1801 1809 1811	CEA100M16LL
C 1522 1637 1806	CKSQYB473K16
C 1523	CKSRYB562K50
C 1524	CKSQYB104K16
C 1526	CEA470M10LL
C 1527 1528 1529 1530	CKSQYB561K50
C 1532 1533	CKSYB105K16
C 1534 1535 1536 1537	CKSRYB102K50
C 1604 1605 1614 1615 1619 1636 1701 1702 1707	CKSRYB103K50
C 1608 1639 1640	CCSRCH220J50
C 1611 1612	CCSRCH220J50
C 1616 0.22F/5.5V	CCL1035
C 1622 1623	CKSRYB103K50
C 1624 1625	CKSRYB103K50
C 1629 1630 1631 1632	CKSRYB103K50
C 1634 470 μF/16V	CCH1183

=====Circuit Symbol & No. Part Name=====	Part No.
C 1638 1812	CEA101M10LL
C 1641 1642	CKSRYB103K50
C 1643	CCSRCH220J50
C 1644 1645	CEA010M50LL
C 1703	CCSRCH090D50
C 1704	CCSRCH090D50
C 1708 1709 1717 1718 1721 1722	CKSRYB103K50
C 1710 1713 1716 1719 1724 1725	CEA220M6R3LL
C 1723 1803 1805 1808	CKSRYB103K50
C 1802 220 μF/16V	CCH1180
C 1804	CEA470M6R3LL
C 1810	CKSQYB104K16
C 1814	CKSQYB104K16
C 1816	CCSRCH101J50
C 1817	CKSQYB103K25

Unit Number : CWM4465
Unit Name : Deck Tuner Unit

MISCELLANEOUS

IC 251	PA0059AM
IC 252	AN6263N
IC 454	XRA3131FS
IC 501	LC72146M
IC 601	PD4653A
IC 602	S-80734ANDYI
IC 603	PD4655B
IC 604	NJM2068MD
IC 605	XRA6288FS
IC 701	PA2024A
IC 751	TA2050S
IC 752	PA0051AM
Q 250 507 704	2SC2712
Q 251 605 706	2SA1162
Q 501 509 510	2SC2712
Q 502	2SK208
Q 506	2SC3295
Q 514	2SC2712
Q 601 603 606 707 753	DTC124EK
Q 602 611 713 751	DTA114EK
Q 604	2SD1760F5
Q 607 608 609 610	DTA144EK
Q 752	2SA1162
D 251 601 602 603 605	1SS133
D 252	MA153
D 501	RD3R0ESB2
D 502 710	MA151WK
D 604	MA3056H
D 704	MA3082L
D 707	MA3051M
L 501 751 Ferri-Inductor	LAU1R0M
L 503 Ferri-Inductor	LAUR12K
L 601 602 603 605 Ferri-Inductor	LAU4R7K
L 604 Ferri-Inductor	LAU4R7K
L 701 Inductor	LCTA1R0J3225
TH 601 Thermistor	CCX1025
X 501 Crystal Resonator 7.2MHz	CSS1334
X 601 Crystal Resonator 6.291456MHz	CSS1303
X 602 Ceramic Resonator 4.194MHz	CSS1071
FM/AM Tuner Unit	CWT1399
EF 701 702 703 EMI Filter	CCQ1070
BZ 601 Buzzer	CPV1011

RESISTORS

R 251 263	RS1/16S563J
R 252 551 709 720	RS1/16S223J
R 253 255	RS1/16S512J
R 254 498 499 501 505 506 537 538 539 540	RS1/16S102J
R 256	RS1/16S684J

=====Circuit Symbol & No. Part Name=====											Part No.
R	257	258	259	260							RS1/16S183J
R	261	487	488	489	490	493	494	526	527	528	RS1/16S473J
R	265	266									RS1/10S152J
R	267	268									RS1/16S222J
R	477	478	635	636	637	638	639	760	761		RS1/16S101J
R	479	480	481	482	483	484					RS1/16S104J
R	485	486	491	492	495	496	502	514			RS1/16S103J
R	503	525	546	606	721						RS1/16S472J
R	504										RS1/16S152J
R	507	718	766								RS1/16S472J
R	516	764									RS1/16S222J
R	517										RS1/16S221J
R	518	717	753	754	765						RS1/16S223J
R	519	677									RS1/16S103J
R	520	521									RS1/16S222J
R	523	524	534								RS1/16S0R0J
R	529	535	536	543	601	610	613	624	625	658	RS1/16S473J
R	530	619									RA4C222J
R	531										RS1/16S103J
R	532										RS1/16S102J
R	542										RS1/16S683J
R	549	550									RS1/16S272J
R	605										RS1/16S473J
R	608	664									RA4C221J
R	609	656	663	669	701	702	719	755	756	762	RS1/16S102J
R	612	668									RS1/16S221J
R	614										RA4C682J
R	615	616									RA3C473J
R	618	621									RA3C222J
R	622	623	629	640	641	657	659	661	678	683	RS1/16S102J
R	628										RA4C681J
R	632										RS1/16S203J
R	633										RS1/16S393J
R	634										RS1/16S823J
R	649										RS1/16S243J
R	650										RS1/16S752J
R	652										RS1/16S123J
R	653										RS1/16S183J
R	655										RS1/16S124J
R	660	676	680	681	688	694	695	706	710	767	RS1/16S473J
R	670										RA4C102J
R	679										RS1/16S682J
R	682										RD1/4PU681J
R	684	687	689	692	697	698	699	700			RS1/16S102J
R	693										RS1/16S474J
R	722										RS1/16S182J
R	723										RS1/16S243J
R	724										RS1/16S563J
R	729	730	731	733	734	735	736	737	739		RD1/4PU391J
R	732										RD1/4PU391J
R	738										RD1/4PU621J
R	740										RS1/16S473J
R	751	752									RS1/16S181J
R	759										RS1/16S620J
R	763										RS1/16S102J
R	768										RS1/16S473J
R	901										RS1/16S123J
R	902										RS1/16S560J

CAPACITORS

C	104							CKSRYB103K25
C	251	252	257	258	262			CEA4R7M16NPLL
C	253	254	617	714				CKSRYB103K25
C	255	256	757	758				CEA100M10NPLL
C	259	267	269	277	476	477	703	CEA101M10LL

=====Circuit Symbol & No. Part Name=====											Part No.
C	260										CEA470M6R3LL
C	263										CEA010M50NPLL
C	264	270	278	475	755	756					CEA100M16LL
C	265	271	272	515	602	613	759				CEA4R7M35LL
C	266										CCSRCH330J50
C	268										CKSQYB223K25
C	273	516	760	763							CKSQYB104K16
C	274	275									CKSRYB222K50
C	276	751	752	753	754						CEA010M50LL
C	469	470	603								CCSRCH330J50
C	471	472	473	474							CCSRCH151J50
C	502				0.047 μF/16V						CCG1008
C	503				4.7 μF/16V						CCH1165
C	504										CKSQYB103K25
C	508										CCSRCH101J50
C	510										CKSRYB103K25
C	511	512	513	514							CKSQYB223K25
C	517	518									CCSRCH150J50
C	519	520	611								CEA2R2M50LL
C	527										CKSRYB103K25
C	528	530	625								CKSQYB473K16
C	529	702	704								CEA470M10LL
C	601	605	612	621	622						CKSQYB103K25
C	604										CCSRCH240J50
C	606	607	608	609	610						CCSRCH270J50
C	614	615									CCSRCH220J50
C	616										CEA220M10LL
C	619	623									CKSRYB102K50
C	624										CKSQYB103K25
C	626	627									CCSRCH101J50
C	629										CCSQCH101J50
C	630	764									CKSQYB103K25
C	631										CKSQYB103K25
C	632										CKSYF105Z16
C	701										CEAS331M10
C	708										CCSRCH101J50
C	709										CKSRYB103K25
C	710	711									CCSRCH101J50
C	712										CKSRYB103K25
C	716										CCSRCH101J50
C	805				0.22F/5.5V						CCL1035

Unit Number : CWM4454
Unit Name : Key Board Unit

MISCELLANEOUS

IC	901	902		(MSC5301B-02GS-V1K)		GGC1055
IC	903					RS-30
D	901	904	905	906	Chip LED	CL170FGCD
D	907	908	909	910	Chip LED	CL170FGCD
D	911	912	913	914	Chip LED	CL170FGCD
D	915	916	917	918	Chip LED	CL170FGCD
D	919	920	921	922	Chip LED	CL170FGCD
D	923	924	925	926	Chip LED	CL170FGCD
D	927	928	929	930	Chip LED	CL170FGCD
D	931	932	933		Chip LED	CL170FGCD
L	901				Inductor	LCYA150K3225
S	901	902	903	904	Switch	CSG1075
S	905	906	907	908	Switch	CSG1075
S	909	910	911	912	Switch	CSG1075
S	913	914	919	920	Switch	CSG1041
S	915	916	917	918	Switch	CSG1075
S	921	922	923		Switch	CSG1041
S	925	926	927		Switch	CSG1075
EL	901				EL	CEL1441
LCD	901				LCD	CAW1326

=====Circuit Symbol & No.	Part Name=====	Part No.
RESISTORS		
R 901 908 915 922 928 961		RS1/10S472J
R 902 909 916 923 929		RS1/10S821J
R 903 910 917 924 930		RS1/10S122J
R 904 911 918 925 931		RS1/10S182J
R 905 912 919 926		RS1/10S302J
R 906 913 920 927		RS1/10S622J
R 907 914 921		RS1/10S223J
R 942 943 944 945		RS1/10S222J
R 946 954		RA4C102J
R 950 952 958		RS1/10S102J
R 951		RS1/10S153J
R 953		RS1/10S473J
R 962		RS1/10S101J
CAPACITORS		
C 901 903		CSZSR100K6R3
C 902 905		CKSQYB103K25
C 904		CKSQYB104K16
Unit Number : CWM4455		
Unit Name : Switch Unit		
MISCELLANEOUS		
S 951 952 953	Switch	CSG-212
IL 951 952	Lamp 14V/40mA	CEL1435
IL 953 954	Lamp 14V/40mA	CEL1436
CAPACITORS		
C 951 952		CKSQYB103K25
Unit Number : CWM4528		
Unit Name : Deck Unit		
MISCELLANEOUS		
IC 251		CXA1911Q
IC 351		PA2020A
Q 351		2SB1260
Q 352		2SC4102
D 351		MA141K
VR 301 302	Semi-fixed 22kΩ(B)	CCP1129
RESISTORS		
R 255 256		RS1/16S181J
R 271		RS1/16S183J
R 272		RS1/16S203J
R 273 274 275 276 321 322 351 352 353 354		RS1/16S102J
R 277 281 282 283 284 373 374 375		RS1/8S0R0J
R 278 301 302 371 404		RS1/16S0R0J
R 355		RS1/10S274J
R 356		RS1/10S202J
R 357		RS1/10S472J
R 358 359		RS1/10S103J
R 360		RS1/10S102J
R 361		RS1/10S622J
R 372		RS1/10S0R0J
R 401		RS1/16S821J
R 402		RS1/16S392J
R 403		RS1/16S105J
CAPACITORS		
C 251 252 253 254		CKSRYB391K50
C 255 256		CKSRYB103K50
C 257 258		CEV470M6R3
C 271 307 308		CKSQYB104K16
C 272 301 302		CEV100M16

=====Circuit Symbol & No.	Part Name=====	Part No.
C 303 304		CEV010M50
C 305 306		CKSQYB683K16
C 322		CEV100M16
C 351		CKSYB224K25
C 352		CKSQYB392K50
C 353 356		CKSQYB103K50
C 354		CKSQYB473K50
C 355		CKSYB104K50
C 401		CCSRCH151J50
C 402		CKSYB684K16
C 403		CKSYB333K25
C 404		CKSRYB333K16

Remote Control Unit
Consists of •Switch P.C.Board(A) •Switch P.C.Board(B)

Unit Number : CWM4651
Unit Name : Remote Control Unit

MISCELLANEOUS

IC 1		PD9011A
Q 1		2SC2412K
Q 2		2SD1664
D 1		SE303AC
D 2	LED	SIR-33ST
X 1	Ceramic Resonator 480kHz	CSS1335
S 1 2 3 4	Push Switch	CSG1061
S 5 6 7 8	Push Switch	CSG1061
S 9 10 11 12	Push Switch	CSG1061
S 13 14 15 16	Push Switch	CSG1061
S 17 18 22 23	Push Switch	CSG1061
S 24	Push Switch	CSG1061
RESISTORS		
R 1		RS11OS222J
R 2		RS11OS820J
R 3		RS11OS123J
R 4		RS18S2R0J
R 5		RS18S5R1J
CAPACITORS		
C 1		CEV470M6R3
C 2		CKSQYB104K16
Unit Number : CWR1064		
Unit Name : Transformer Unit		
T 1801	Transformer	CTT1052
Unit Number : CWX1910		
Unit Name : Control Unit		
MISCELLANEOUS		
IC 1001		UPC2571GS
IC 1201		UPB3700GF1
IC 1301		PA3126
IC 1302		XR-6285FP
IC 1303		NJM4558M
IC 1603		PD4501A
IC 1701		PD4690A
IC 1902		PQ5TZ51
Q 1001		2SB1132
Q 1603		2SB709A

=====Circuit Symbol & No.	Part Name=====	Part No.
Q 1701		UN2111
D 1801 1802	Chip LED	CL200IRX
D 1901 1902 1903 1904		SC016-2
L 1701	Inductor	LCTB4R7K2125
TH1701	Thermistor	CCX1015
X 1701	Resonator 8.380MHz	CSS1354
S 1801 1802	Switch	CSN1028
VR1001	Semi-fixed 2.2kΩ(B)	CCP1177
VR1002	Semi-fixed 22kΩ(B)	CCP1183
VR1003	Semi-fixed 47kΩ(B)	CCP1185
VR1004	Semi-fixed 47kΩ(B)	CCP1185
	Checker Chip	CKF1031

RESISTORS

R 1001	RS1/8S100J
R 1002	RS1/8S120J
R 1003 1201 1307 1610 1702	RS1/16S103J
R 1004 1024 1025 1315 1318 1719	RS1/16S102J
R 1005	RS1/16S823J
R 1006	RS1/16S182J
R 1007	RS1/16S333J
R 1011 1012	RS1/16S683J
R 1013 1311	RS1/16S102J
R 1014 1310 1725 1728	RS1/16S473J
R 1018 1020	RS1/16S622J
R 1019	RS1/16S563J
R 1021	RS1/16S513J
R 1022	RS1/16S133J
R 1026	RS1/16S102J
R 1027	RS1/16S183J
R 1028	RS1/16S822J
R 1029	RS1/16S0R0J
R 1301 1302	RS1/16S222J
R 1303	RS1/16S223J
R 1304	RS1/16S123J
R 1305 1306	RS1/16S332J
R 1308	RS1/16S163J
R 1309	RS1/16S103J
R 1317 1727	RS1/16S473J
R 1319 1320	RS1/16S102J
R 1601	RS1/16S301J
R 1703 1704 1715 1718	RS1/16S222J
R 1706	RS1/16S303J
R 1707 1708	RS1/16S473J
R 1709	RS1/16S122J
R 1710	RS1/16S472J
R 1716 1717	RS1/16S104J
R 1720 1723	RS1/16S681J
R 1721 1722 1724	RS1/16S681J
R 1801 1802	RS1/8S821J

CAPACITORS

C 1001 1008 1010 1011 1303	CKSRYB102K50
C 1002 1904	CEV101M6R3
C 1003 1703	CKSQYB104K16
C 1004	CEV470M6R3
C 1005	CCSRCH101J50

=====Circuit Symbol & No.	Part Name=====	Part No.
C 1006 1023		CKSRYB561K50
C 1007 1902		CKSYB334K16
C 1009		CCSRCH181J50
C 1013		CKSRYB103K50
C 1014		CCSRCH220J50
C 1015 1016 1017 1018		CKSYF105Z16
C 1021		CKSYB104K50
C 1022		CKSRYB332K50
C 1201 1202		CKSYF105Z16
C 1203		CKSRYB102K50
C 1301 1302		CKSRYF683Z25
C 1304		CKSRYB152K50
C 1305		CKSRYB271K50
C 1307 1308		CKSRYB103K50
C 1309 1311		CEV101M10
C 1310 1616		CKSRYB103K50
C 1601		CCSRCH151J50
C 1704		CKSRYB472K50
C 1901		CEV220M16
C 1903		CKSYB224K16

Unit Number :
Unit Name : Drive Assy

S 998 999		Switch(Close,Open)	CSN1022
M 1		Motor	CXM1085

Unit Number :
Unit Name : Detector P.C.Board

P 1 2		Photo-Transistor	PT4800

Unit Number :
Unit Name : P.C.Board Unit

S 1 2		Switch(70μS,Load)	ESG1004
EGN 1		Photo-Interlapter	EGN1005
R 1			RD1/4HM181J

Unit Number :
Unit Name : Reel P.C.Board

EGN 2 3		Photo-Refrector	EGN1004

Miscellaneous Parts List

S 1		Switch(Cassette Sense)	CSN-088
M 1		Motor Unit(Spindle)	CXA7001
M 2		Motor Unit(Carriage)	CXA7150
M 3		Motor Unit(Loading)	CXA6456
		PU Unit	CGY1031
M 1		Motor Unit(Main)	EXA1428
M 2		Motor Unit(Sub)	EXA1382
HD 1		Head Assy	EXA1404

8. LCD

● **CAW1326**

SEGMENT

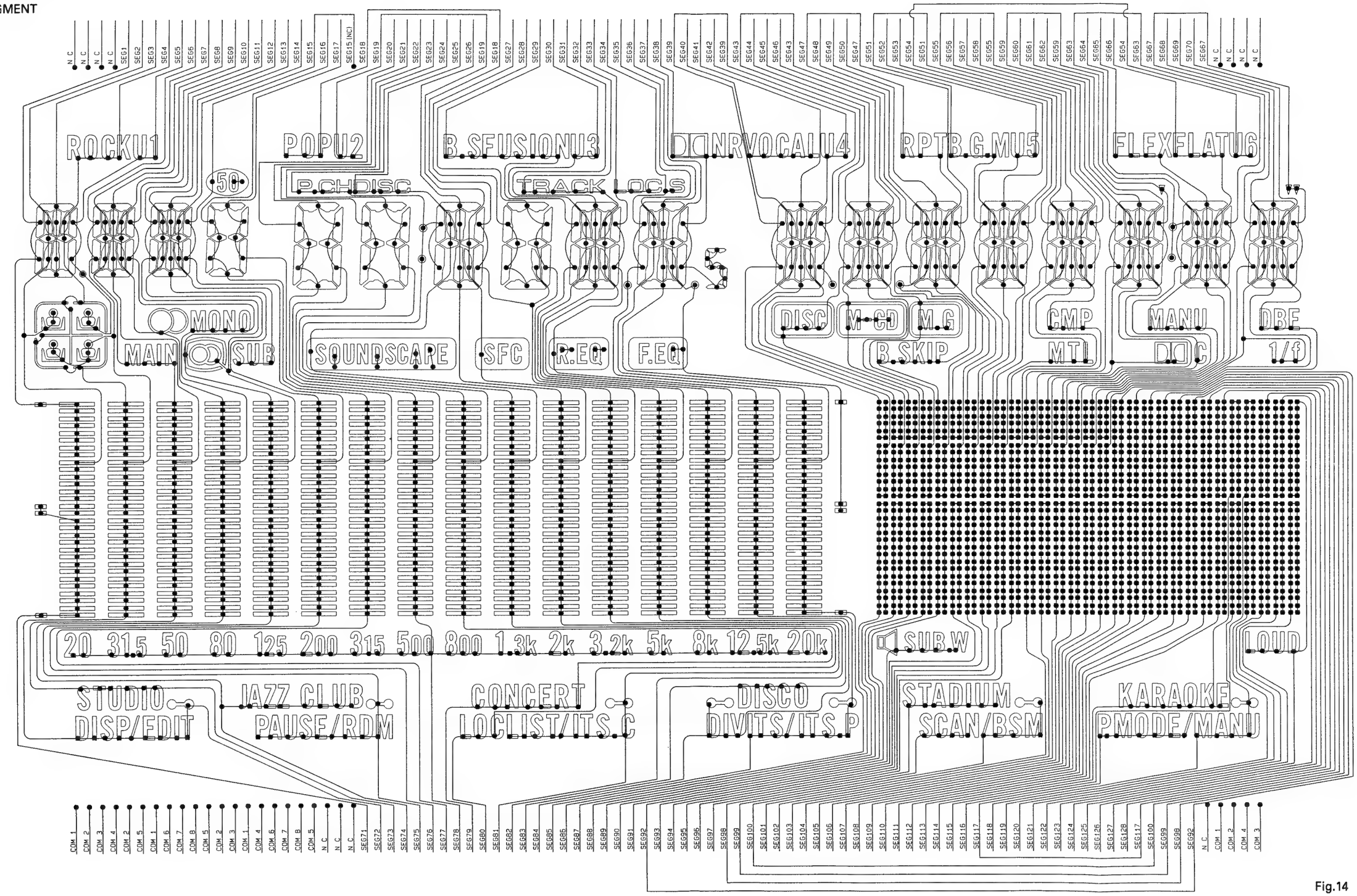


Fig.14

COMMON

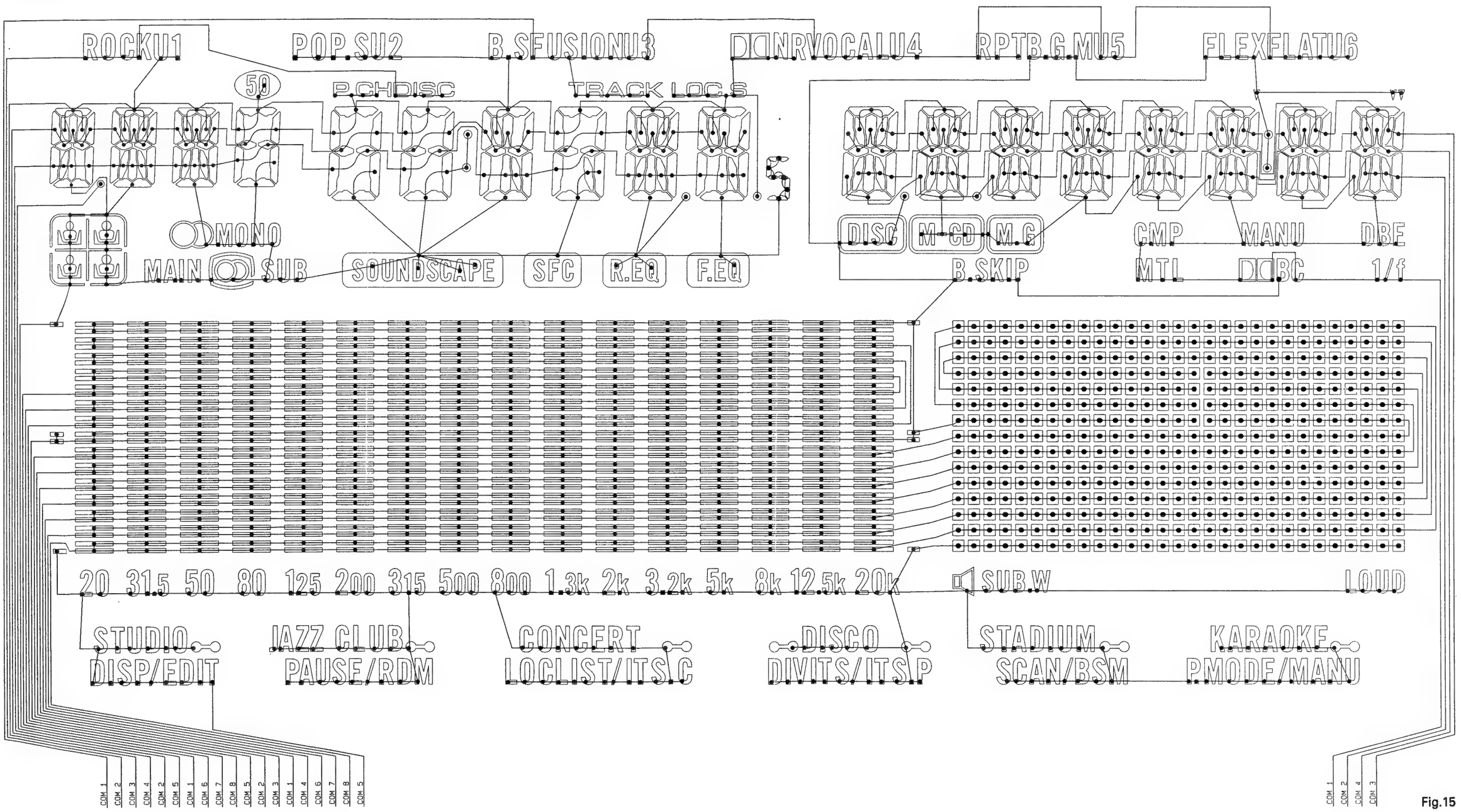


Fig.15

9. BLOCK DIAGRAM

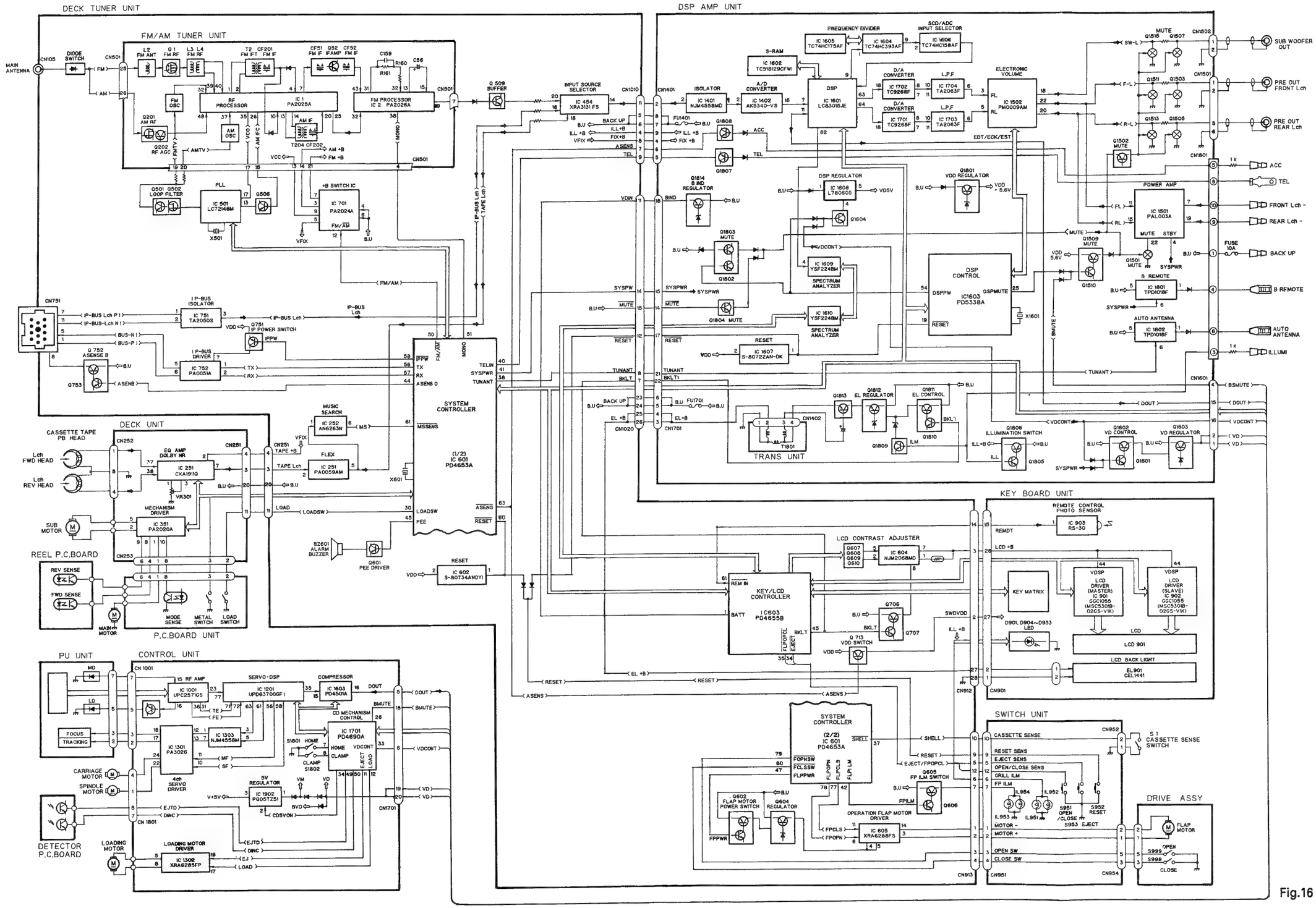


Fig.16

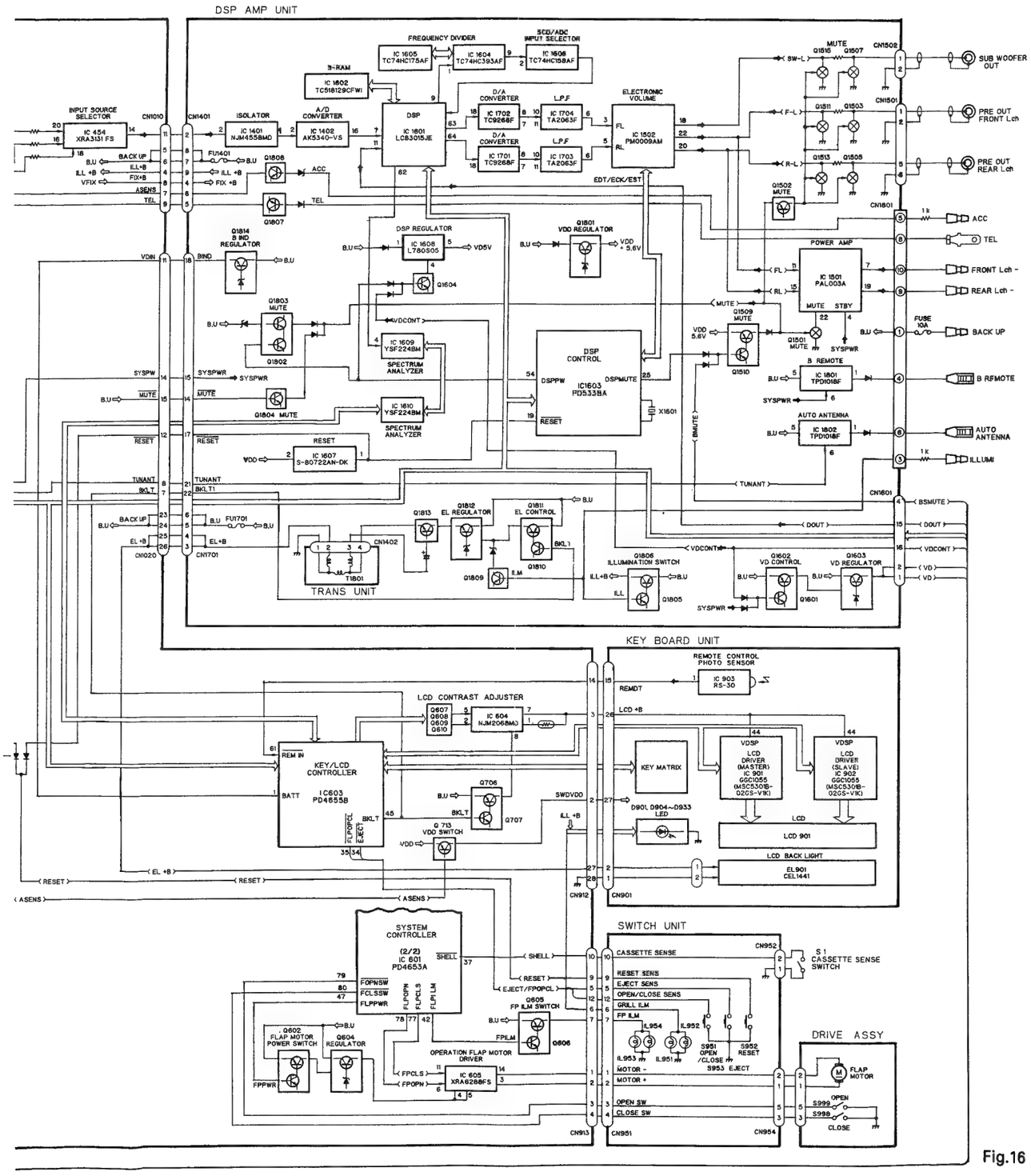
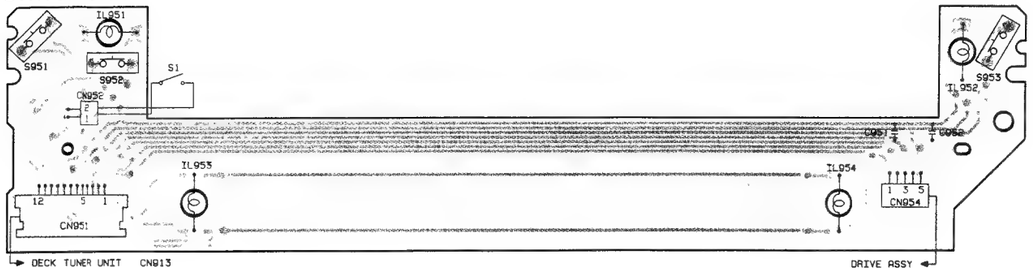

DSP AMP UNIT
INPUT SOURCE SELECTOR
IC 454 XRA3131 FS
CN1010
CN1401
ISOLATOR
IC 1401 NJM4558MD
A/D CONVERTER
IC 1402 AK5340-VS
S-RAM
IC 1602 TC518129CFWI
DSP
IC 1601 LC83015JE
FREQUENCY DIVIDER
IC 1605 TC74HC175AF
IC 1604 TC74HC393AF
SCD/ADC INPUT SELECTOR
IC 1606 TC74HC158AF
D/A CONVERTER
IC 1702 TC9268F
IC 1701 TC9268F
L.P.F
IC 1704 TA2063F
IC 1703 TA2063F
ELECTRONIC VOLUME
IC 1502 PM0009AM
EDT/ECK/EST
BACK UP
ILL +B
FIX+B
VFIX
ASENS
TEL
ACC
Q1806
Q1807
FU1401
Q1814 B IND REGULATOR
VDIN
BIND
DSP REGULATOR
IC 1608 L7805CS
VD5V
Q1604
Q1801 VDD REGULATOR
VDD +5.6V
Q1803 MUTE
Q1802
VDCONT
IC 1609 YSF224BM
SPECTRUM ANALYZER
IC 1610 YSF224BM
SYSPW
SYSPWR
MUTE
Q1804 MUTE
RESET
IC 1607 S-80722AN-DK
TUNANT
BKLT1
DSP CONTROL
IC1603 PD5333BA
DSPPW
DSPMUTE
RESET
X1501
Q1813
Q1812 EL REGULATOR
Q1811 EL CONTROL
Q1810
Q1809
ILM
CN1402
T1801
TRANS UNIT
EL +B
CN1020
CN1701
FU1701
Q1806 ILLUMINATION SWITCH
Q1805
ILL
Q1509 MUTE
Q1510
Q1501 MUTE
Q1502 MUTE
Q1507
Q1515
Q1503
Q1511
Q1505
Q1513
MUTE
SW-L
F-L
R-L
CN1502
CN1501
SUB WOOFER OUT
PRE OUT FRONT Lch
PRE OUT REAR Lch
POWER AMP
IC 1501 PAL003A
MUTE STBY
FL
RL
FRONT Lch -
REAR Lch -
CN1801
1 k
ACC
TEL
FUSE 10A
BACK UP
B REMOTE
IC 1801 TPD1018F
B RFMOTE
AUTO ANTENNA
IC 1802 TPD1018F
AUTO ANTENNA
ILLUMI
CN1601
BSMUTE
DOUT
VDCONT
VD
Q1602 VD CONTROL
Q1603 VD REGULATOR
Q1601
KEY BOARD UNIT
REMOTE CONTROL PHOTO SENSOR
IC 903 RS-30
REMDT
LCD CONTRAST ADJUSTER
Q607 Q608 Q609 Q610
IC 604 NJM2068MD
LCD +B
KEY/LCD CONTROLLER
IC603 PD4855B
REM IN
BATT
BKLT
FLPOPCL
EJECT
KEY MATRIX
VDSP LCD DRIVER (MASTER) IC 901 GGC1055 (MSC5301B-02GS-VK)
VDSP LCD DRIVER (SLAVE) IC 902 GGC1055 (MSC5301B-02GS-VK)
D901, D904~D933 LED
LCD
LCD 901
LCD BACK LIGHT
EL901 CEL1441
Q706
Q707
SWDVDD
Q 713 VDD SWITCH
CN912
CN901
SYSTEM CONTROLLER
(2/2) IC 601 PD4653A
SHELL
FOPNSW
FCLSSW
FLPPWR
FLPOPN
FLPCLS
FLPILLM
SWITCH UNIT
CN952
CASSETTE SENSE
RESET SENS
EJECT SENS
OPEN/CLOSE SENS
GRILL ILM
FP ILM
S1 CASSETTE SENSE SWITCH
Q605 FP ILM SWITCH
Q606
IL954
IL952
IL953
IL951
S951 OPEN /CLOSE
S952 RESET
S953 EJECT
Q602 FLAP MOTOR POWER SWITCH
Q604 REGULATOR
OPERATION FLAP MOTOR DRIVER
IC 605 XRA6286FS
MOTOR -
MOTOR +
OPEN SW
CLOSE SW
CN913
CN951
CN954
DRIVE ASSY
FLAP MOTOR
S999
S998
OPEN
CLOSE

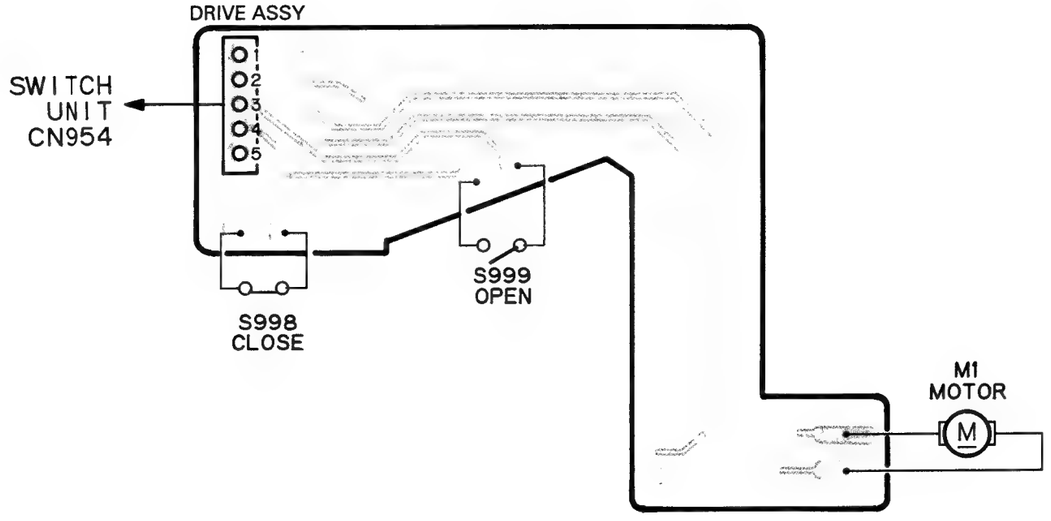
Fig.16

10. CONNECTION DIAGRAM

SWITCH UNIT



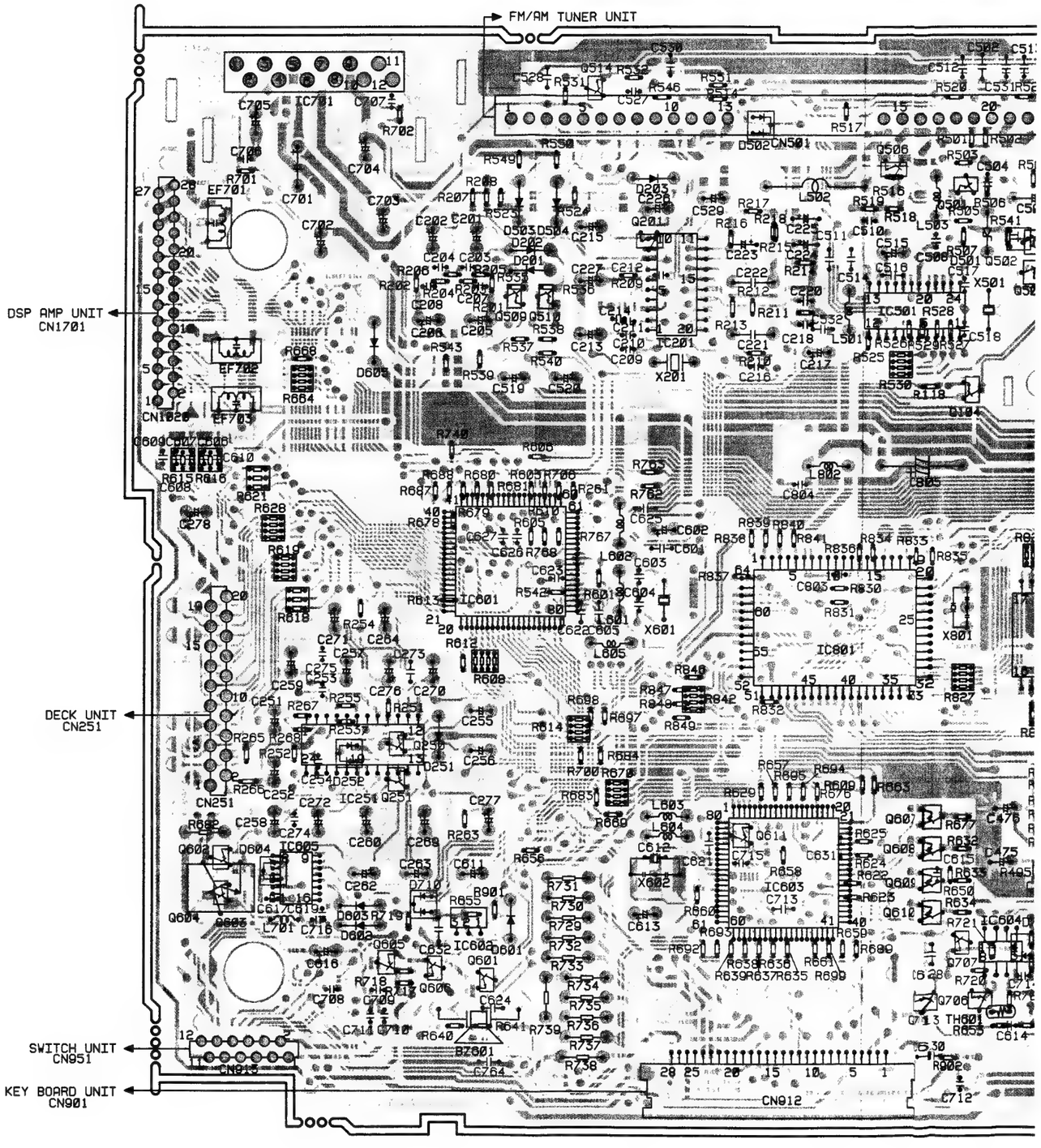
DRIVE ASSY



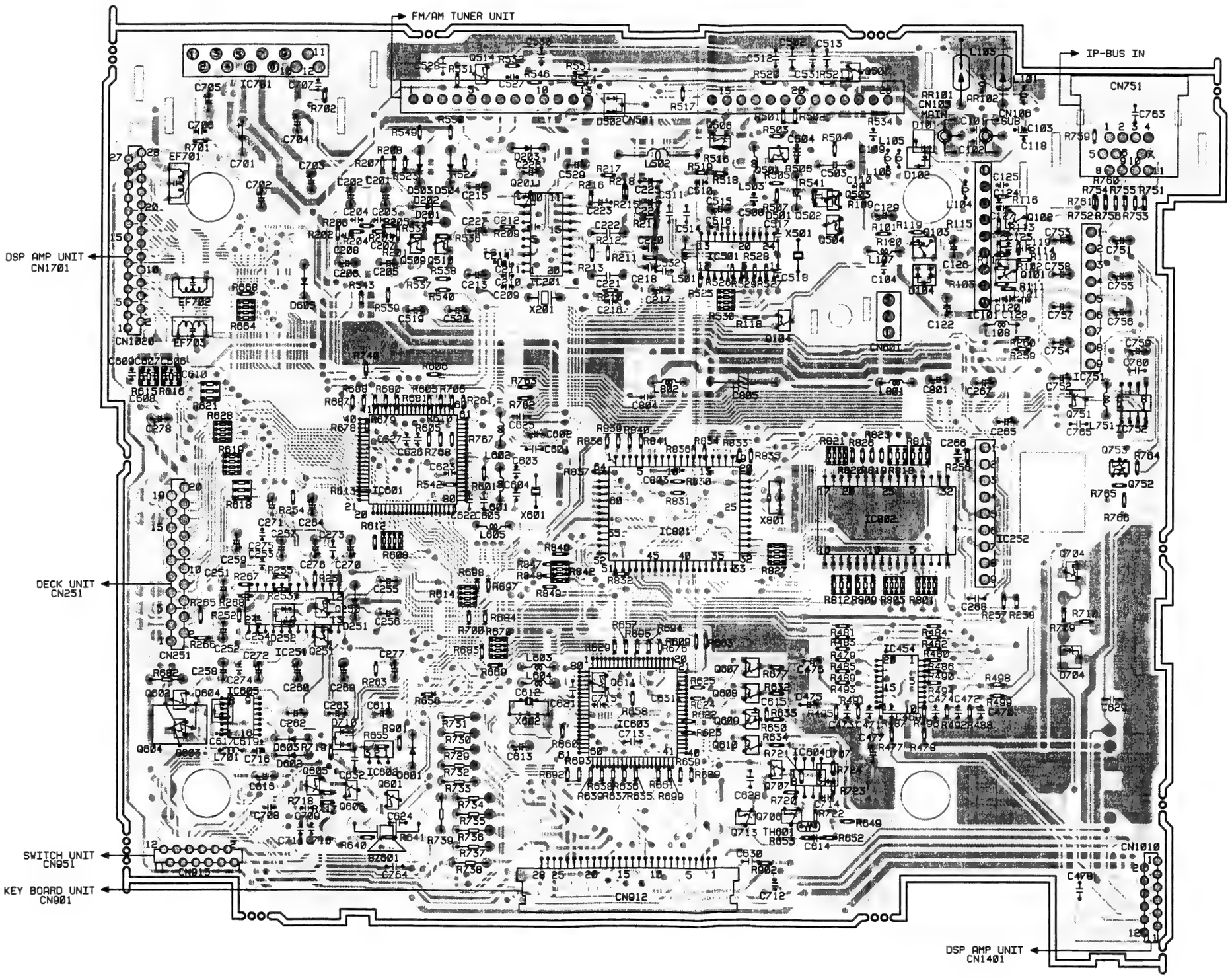
NOTE:

The parts mounted on this PCB include all necessary parts for several desitnations.
For further information for respective destinations, be sure to check with the schematic diagram.

DECK TUNER UNIT



DECK TUNER UNIT

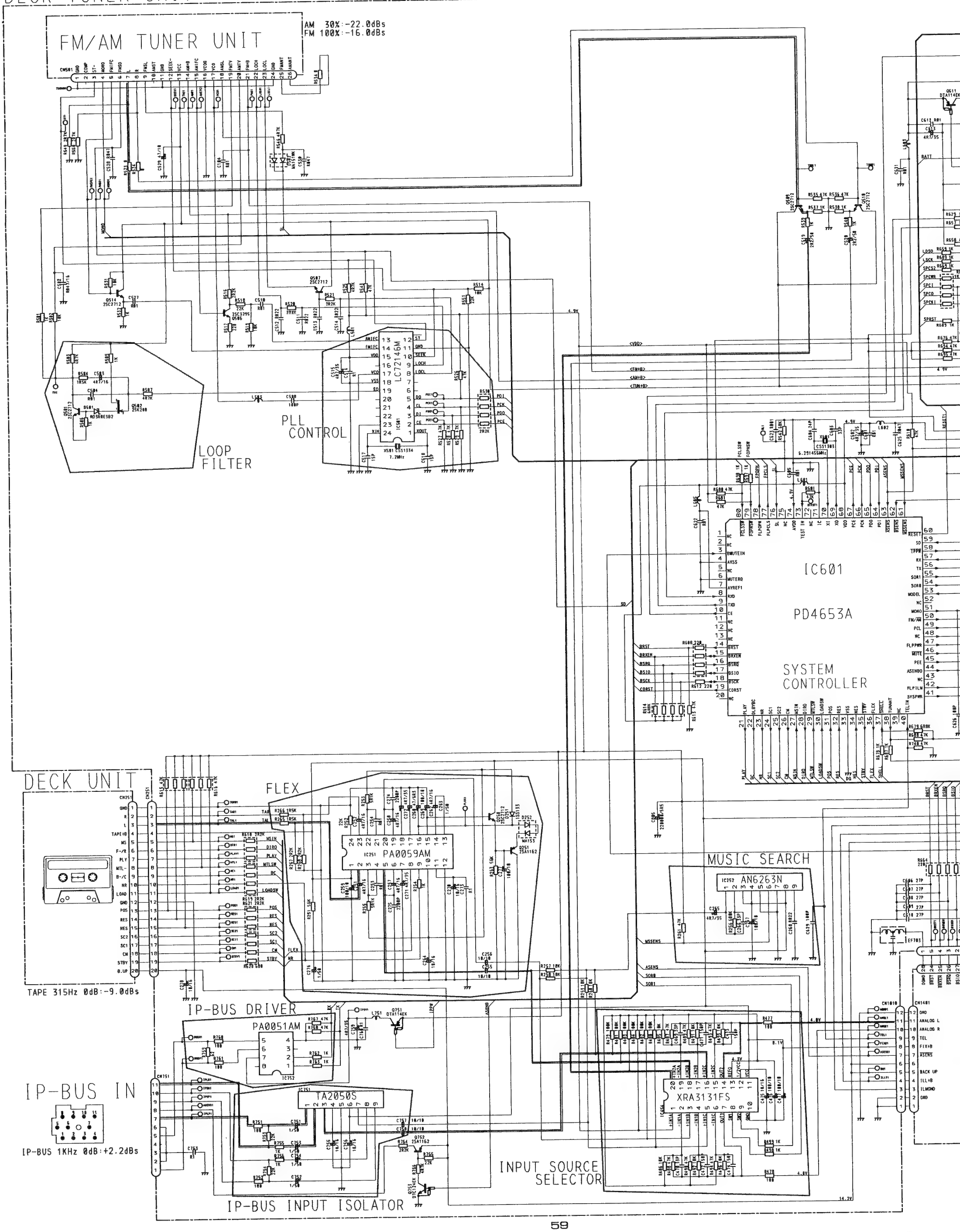


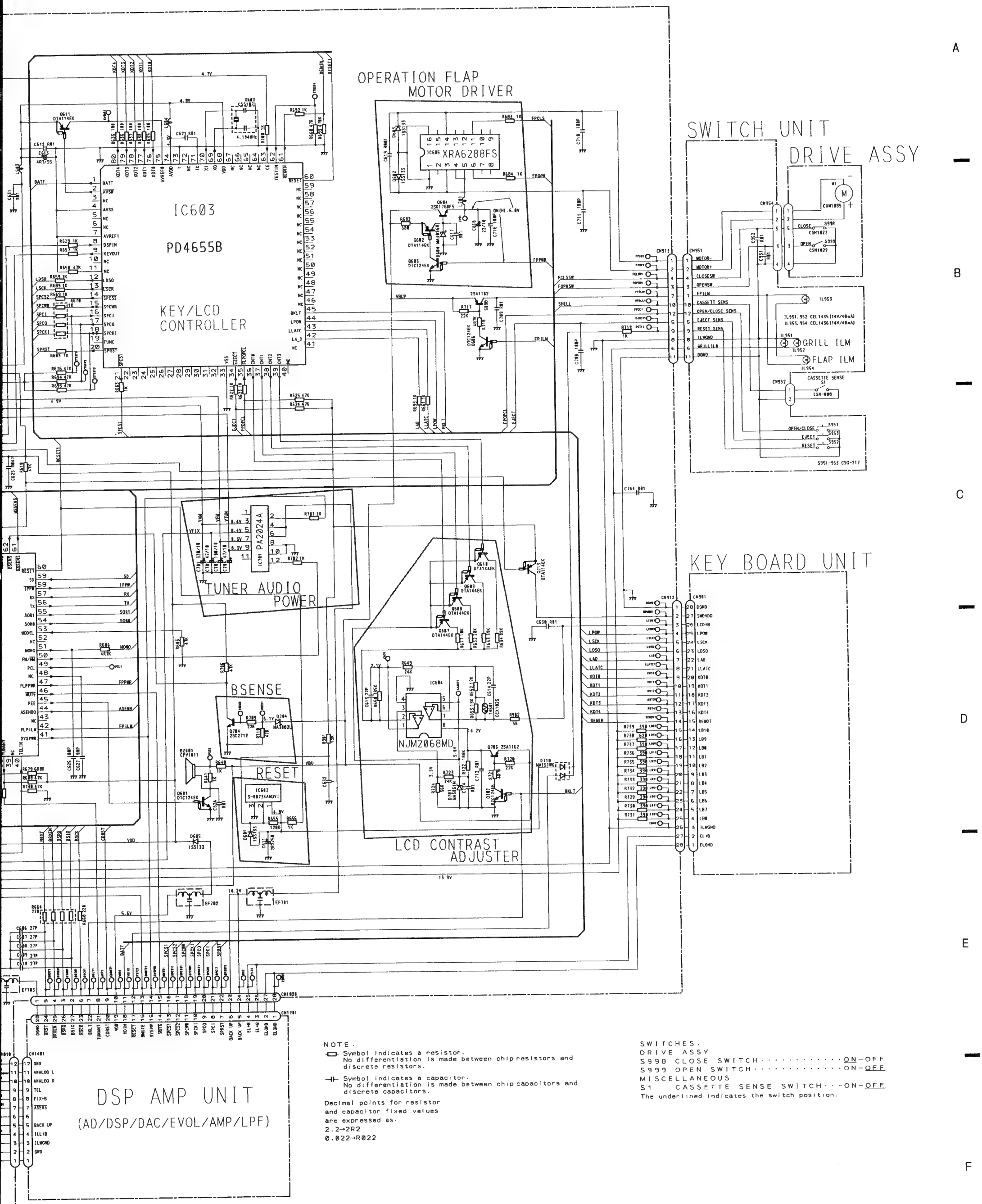
ADJ	IC, Q
	IC701 Q514 Q507
	Q506 Q501
	Q201 Q503 Q502 Q102
	Q504
	IC201 Q103 IC101 Q509 Q510 IC501
	Q101
	IC751 Q104
	Q751 IC752
	IC601 Q752 Q753
	IC801 IC802 IC252
	Q704
	Q250 IC251
	Q251
	Q607 IC454 Q611
	Q602 Q608
	IC603 IC605 Q609 Q604 Q603
	Q610 IC602
	IC604 Q707
	Q605 Q606 Q601
	Q713 Q706

Fig.17

11. SCHEMATIC CIRCUIT DIAGRAM

DECK TUNER UNIT





NOTE.

- Symbol indicates a resistor. No differentiation is made between chip resistors and discrete resistors.
- Symbol indicates a capacitor. No differentiation is made between chip capacitors and discrete capacitors.

Decimal points for resistor and capacitor fixed values are expressed as.
2.2→2R2
0.022→R022

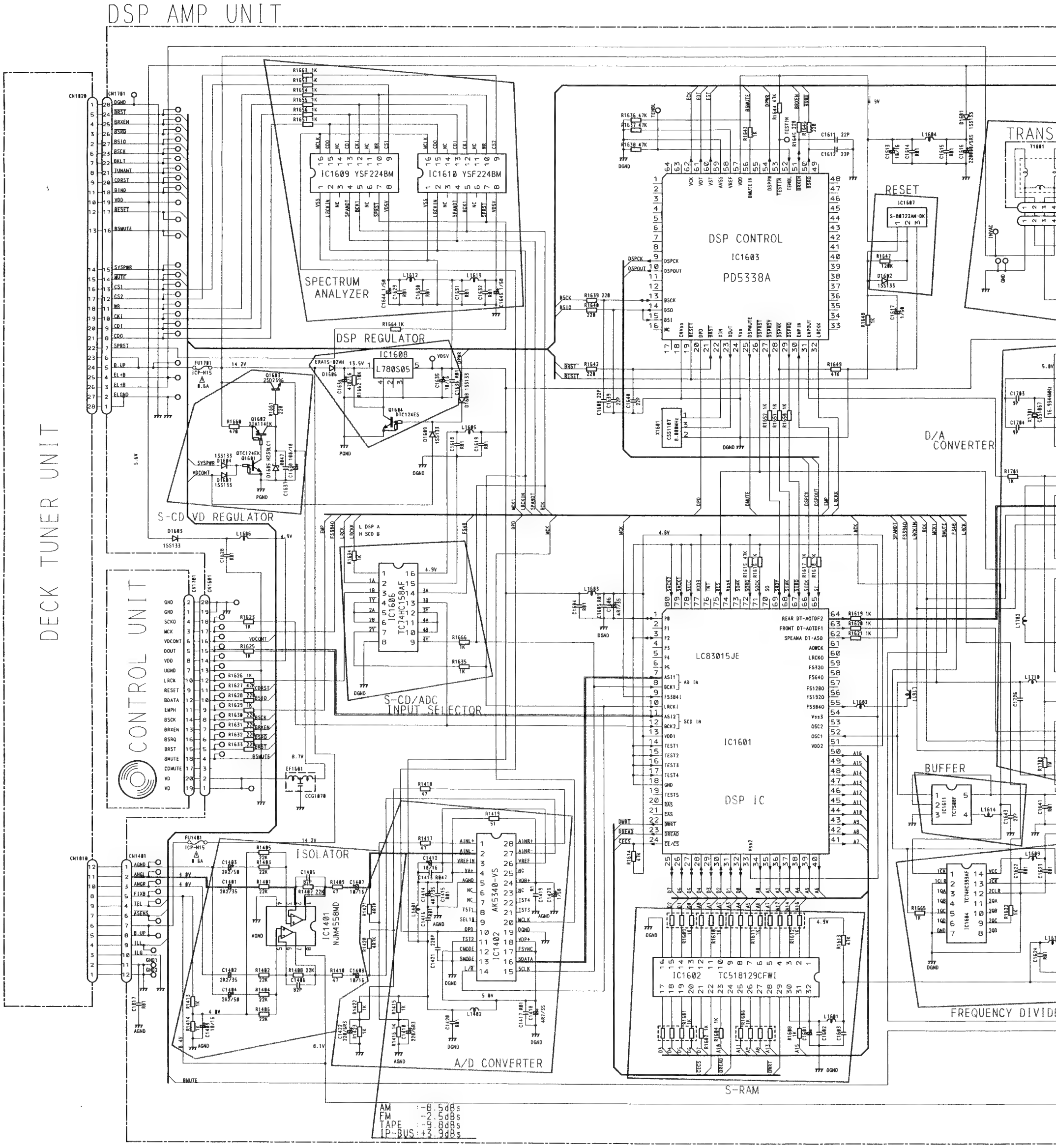
SWITCHES.
DRIVE ASSY
S998 CLOSE SWITCH ..... ON-OFF
S999 OPEN SWITCH ..... ON-OFF
MISCELLANEOUS
S1 CASSETTE SENSE SWITCH ... ON-OFF
The underlined indicates the switch position.

Fig.18

12. CIRCUIT DIAGRAM AND PATTERN

12.1 DSP AMP UNIT, TRANS UNIT

● **Circuit Diagram**



The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

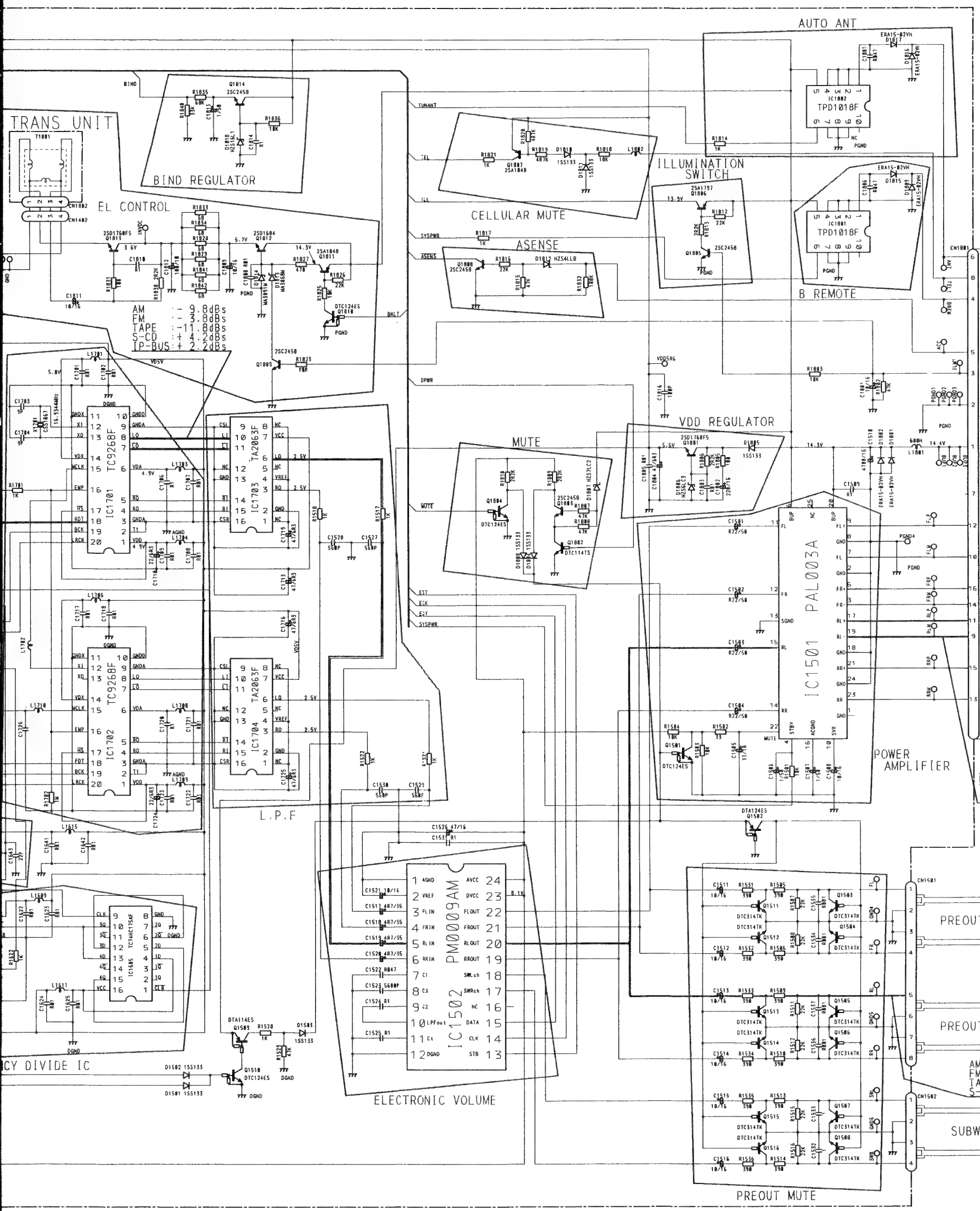


Fig.19

● Connection Diagram

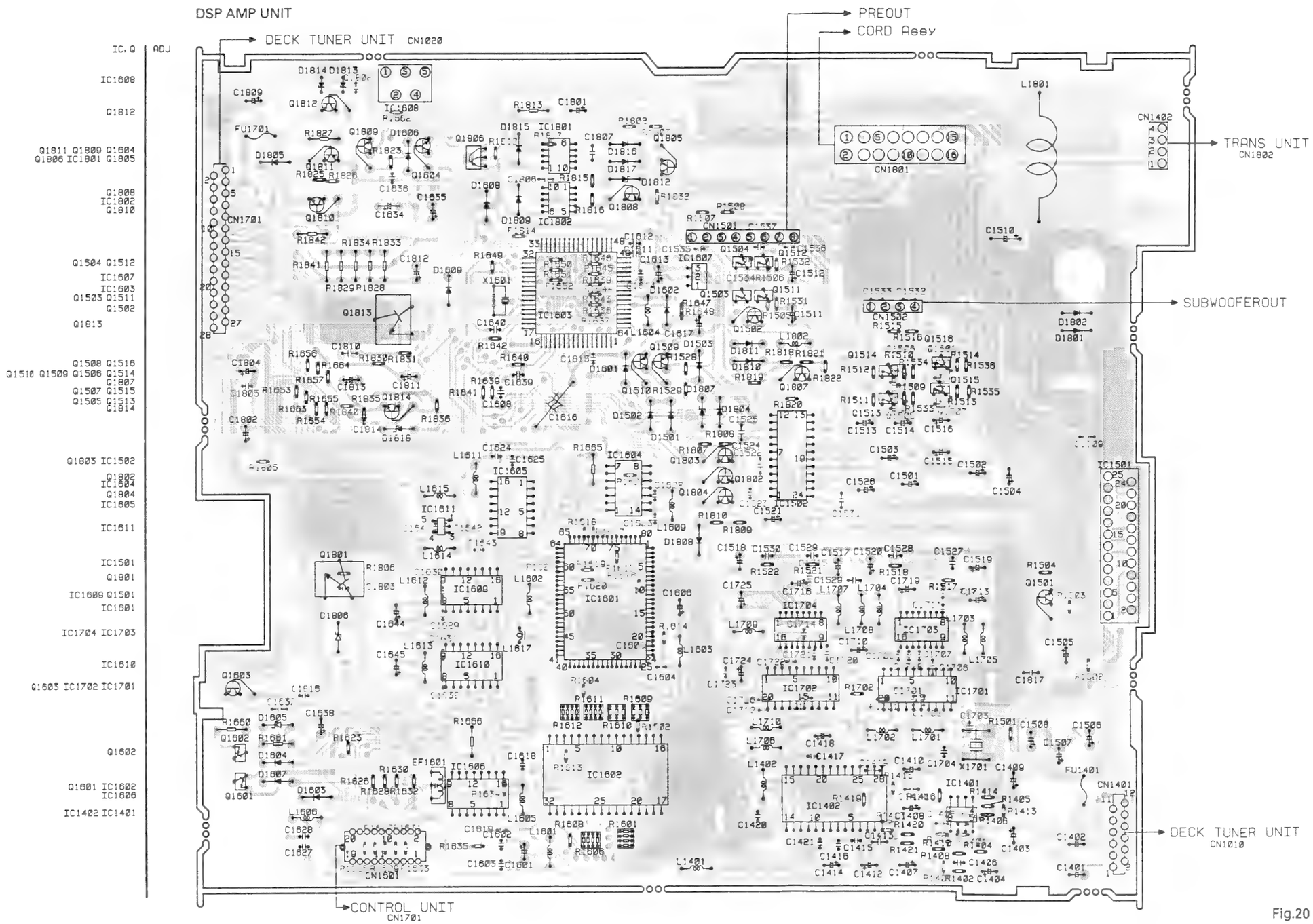


Fig.20

NOTE:

The parts mounted on this PCB include all necessary parts for several destinations.
For further information for respective destinations, be sure to check with the schematic diagram.

12.2 FM/AM TUNER UNIT

● Connection Diagram

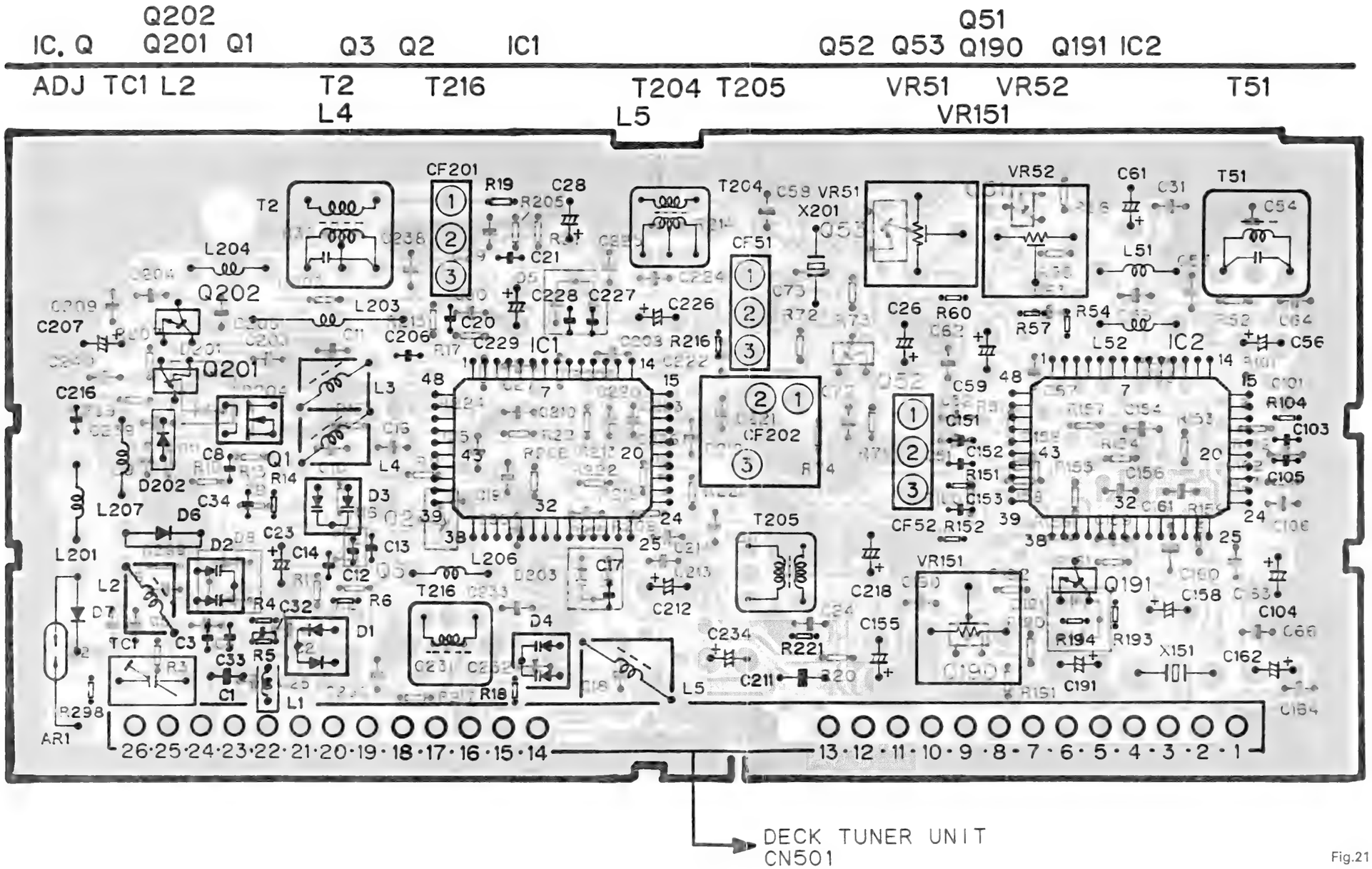


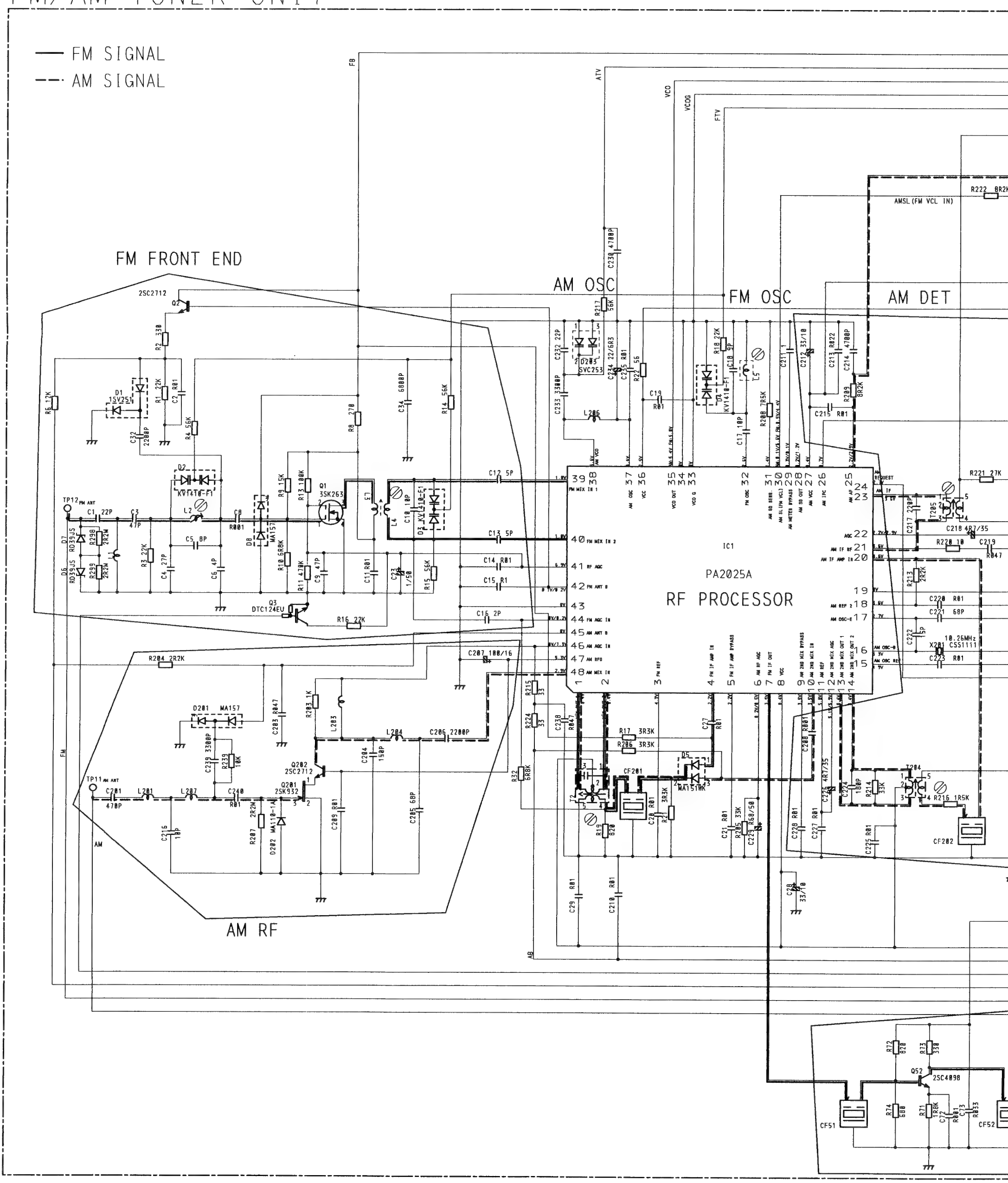
Fig.21

NOTE:

The parts mounted on this PCB include all necessary parts for several destinations.
For further information for respective destinations, be sure to check with the schematic diagram.

● **Circuit Diagram**

FM/AM TUNER UNIT



NOTE :

- Symbol indicates a resistor. No differentiation is made between chip resistors and discrete resistors.
- Symbol indicates a capacitor. No differentiation is made between chip capacitors and discrete capacitors.

Decimal points for resistor and capacitor fixed values are expressed as:
2.2→2R2
0.022→R022

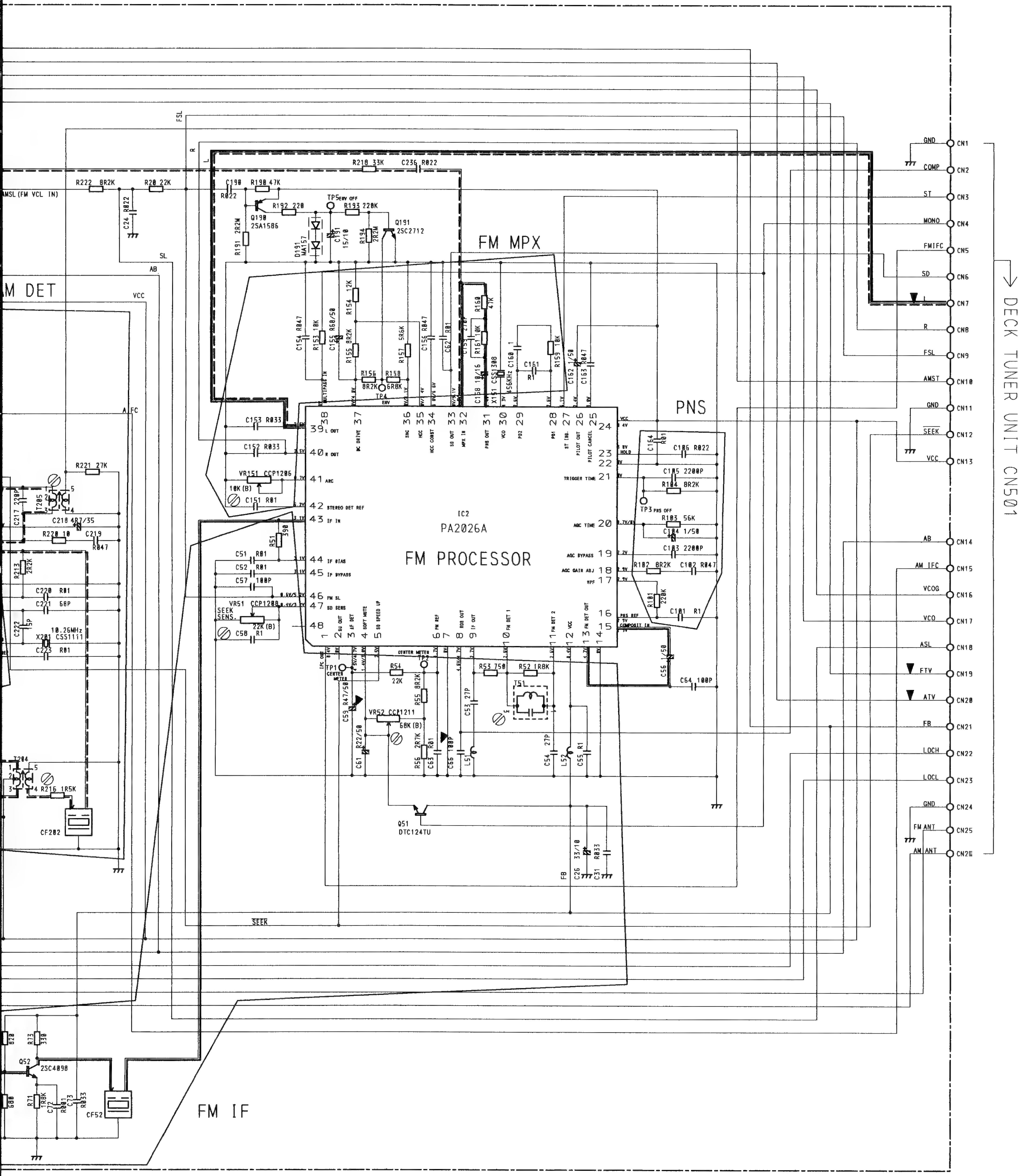

FM MPX
PNS
FM PROCESSOR
IC2
PA2026A
FM IF
M DET
DECK TUNER UNIT CN501
GND CN1
COMP CN2
ST CN3
MONO CN4
FMIFC CN5
SD CN6
L CN7
R CN8
FSL CN9
AMST CN10
GND CN11
SEEK CN12
VCC CN13
AB CN14
AM IFC CN15
VCOG CN16
VCO CN17
ASL CN18
FTV CN19
ATV CN20
FB CN21
LOCH CN22
LOCL CN23
GND CN24
FM ANT CN25
AM ANT CN26
AMSL (FM VCL IN)
R222 8R2K
R20 22K
C24 R022
R218 33K
C236 R022
C190 R022
R190 47K
R191 2R2M
Q190 2SA1586
R192 220
TP5 ENV OFF
R193 220K
D191 MA157
C191 15/10
R194 2R2M
Q191 2SC2712
C154 R047
R153 10K
C155 R68/50
R154 12K
R155 8R2K
R156 8R2K
R158 6R8K
TP4 ENV
R157 5R6K
C156 R047
C62 R01
C159 270P
R161 10K
R160 47K
C158 10/16
X151 CSS1308 456KHz
C160 1
C161 R1
R159 10K
C162 1/50
C163 R047
C153 R033
C152 R033
VR151 CCP1206 10K (B)
C151 R01
R51 390
C51 R01
C52 R01
C57 100P
VR51 CCP1208 SEEK SENS. 22K (B)
C58 R1
TP1 CENTER METER
TP2
R54 22K
R55 8R2K
C59 R47/50
VR52 CCP1211 68K (B)
C61 R22/50
R56 2R7K
C63 R01
C66 100P
C53 27P
L51
R53 750
R52 1R8K
T51
C54 27P
L52
C55 R1
C56 1/50
C64 100P
C154 R01
C106 R022
C105 2200P
R104 8R2K
TP3 PNS OFF
R103 56K
C104 1/50
C103 2200P
R102 8R2K
C102 R047
R101 220K
C101 R1
Q51 DTC124TU
C26 33/10
C31 R033
FB
SEEK
SL
AB
VCC
AFC
R221 27K
T205
C217 220P
C218 4R7/35
R220 10
C219 R047
R213 2R2K
C220 R01
C221 68P
C222 15P
X201 CSS1111 10.26MHz
C223 R01
T204
R216 1R5K
CF202
R73 330
Q52 2SC4098
R71 1R8K
C72 R001
C73 R033
CF52
FSL
R
L

Fig.22

12.3 CD MECHANISM MODULE

● Circuit Diagram

SL SIGNAL LINE
F FOCUS SERVO LINE
T TRACKING SERVO LINE
C CARRIAGE SERVO LINE
S SPINDLE SERVO LINE

CONTROL UNIT

PU UNIT(CGY1031)

RF AMP/AUTO POWER CONTROL

IC1001 UPC2571GS

CD DRIVER

IC1301 PA3026

LOADING MOTOR DRIVER

IC1302 XRA6285FP

DETECTOR P.C.BOARD

CN1001

CN1002

IC1201 UPD637000 FOCUS/TRACK CARRIAGE/SP DIGITAL SER DIGITAL SIG PROCESSOR

AGND DGND +5VA +5VD

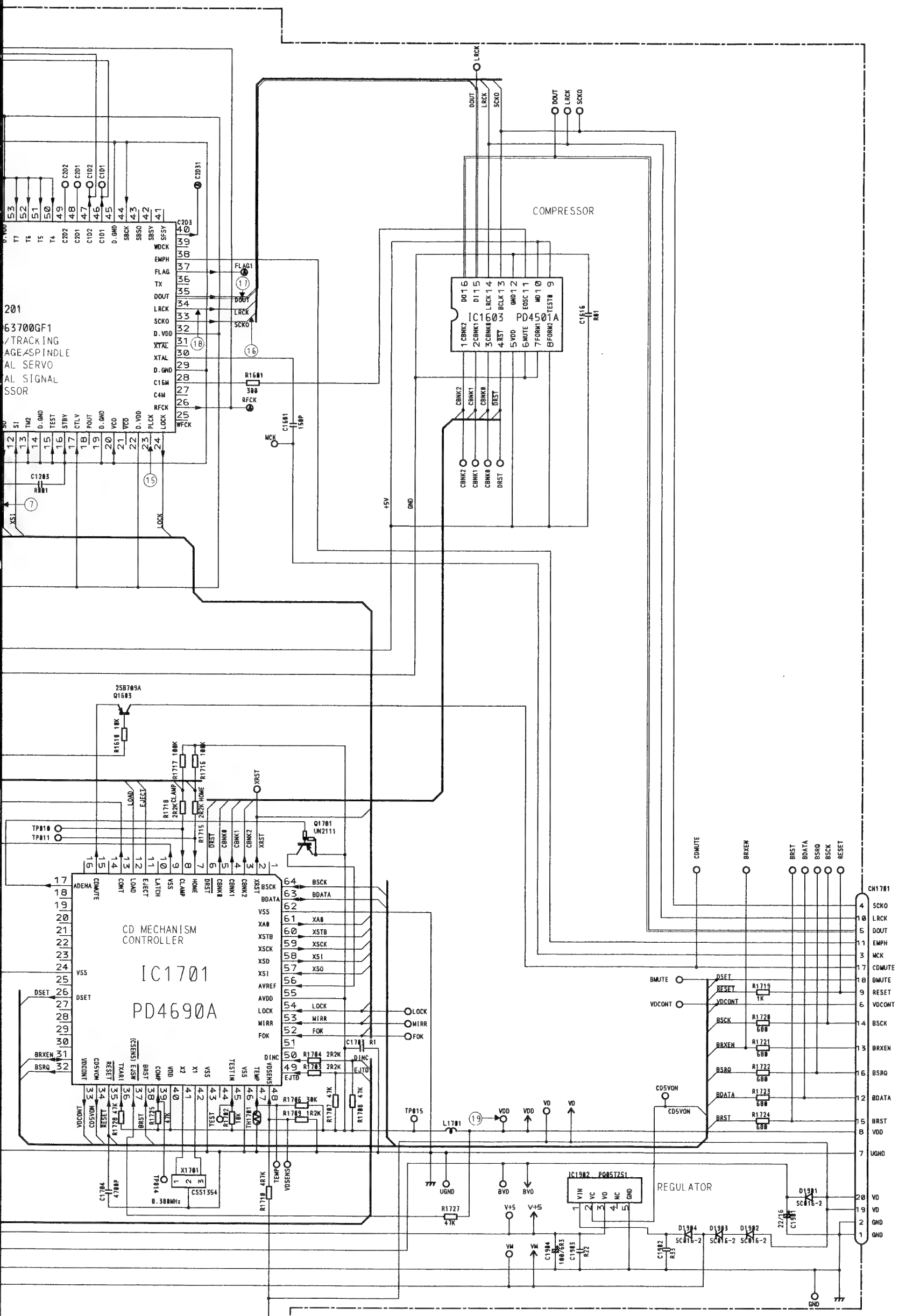

COMPRESSOR
IC1603 PD4501A
CD MECHANISM CONTROLLER
IC1701
PD4690A
REGULATOR
IC1902 PQ05T251
DSP AMP UNIT
CN1601
CN1701
X1701
8.388MHz
C5S1354
2SB709A
Q1603
Q1701
UN2111
SWITCHES:
CONTROL UNIT
S1801:HOME SWITCH・・・・ON-OFF
S1802:CLAMP SWITCH・・・ON-OFF
The underlined indicates the switch position.

Fig.23

CONTROL UNIT

IC, Q — IC1302 IC1301 IC1303 — IC1603 — Q1701 Q1603 — Q1001 IC1201 IC1701 — IC1001 — IC1902

ADJ — VR1003 VR1001 VR1002 VR1004

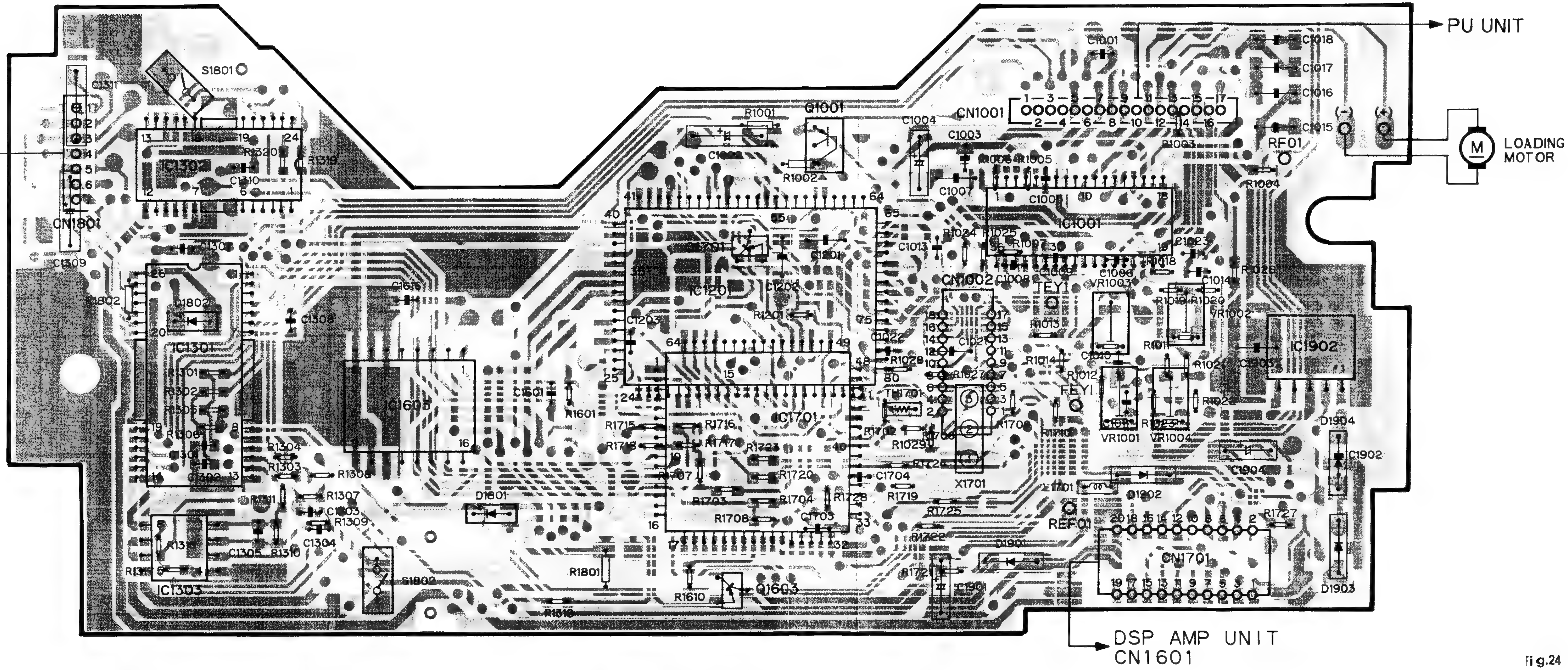
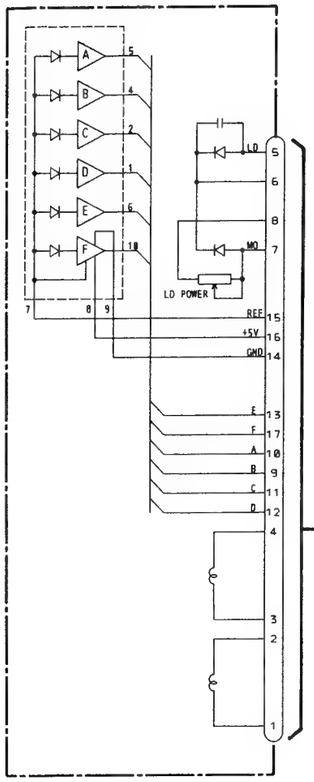


Fig.24

● Connection Diagram

PU UNIT(CGY1031)



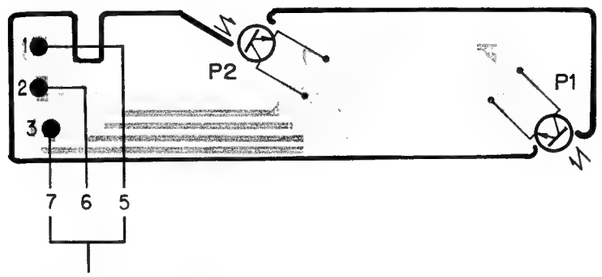
CONTROL UNIT
CN1001

M1
SPINDLE
MOTOR

M2
CARRIAGE
MOTOR

DETECTOR
P.C.BOARD

DETECTOR P.C. BOARD

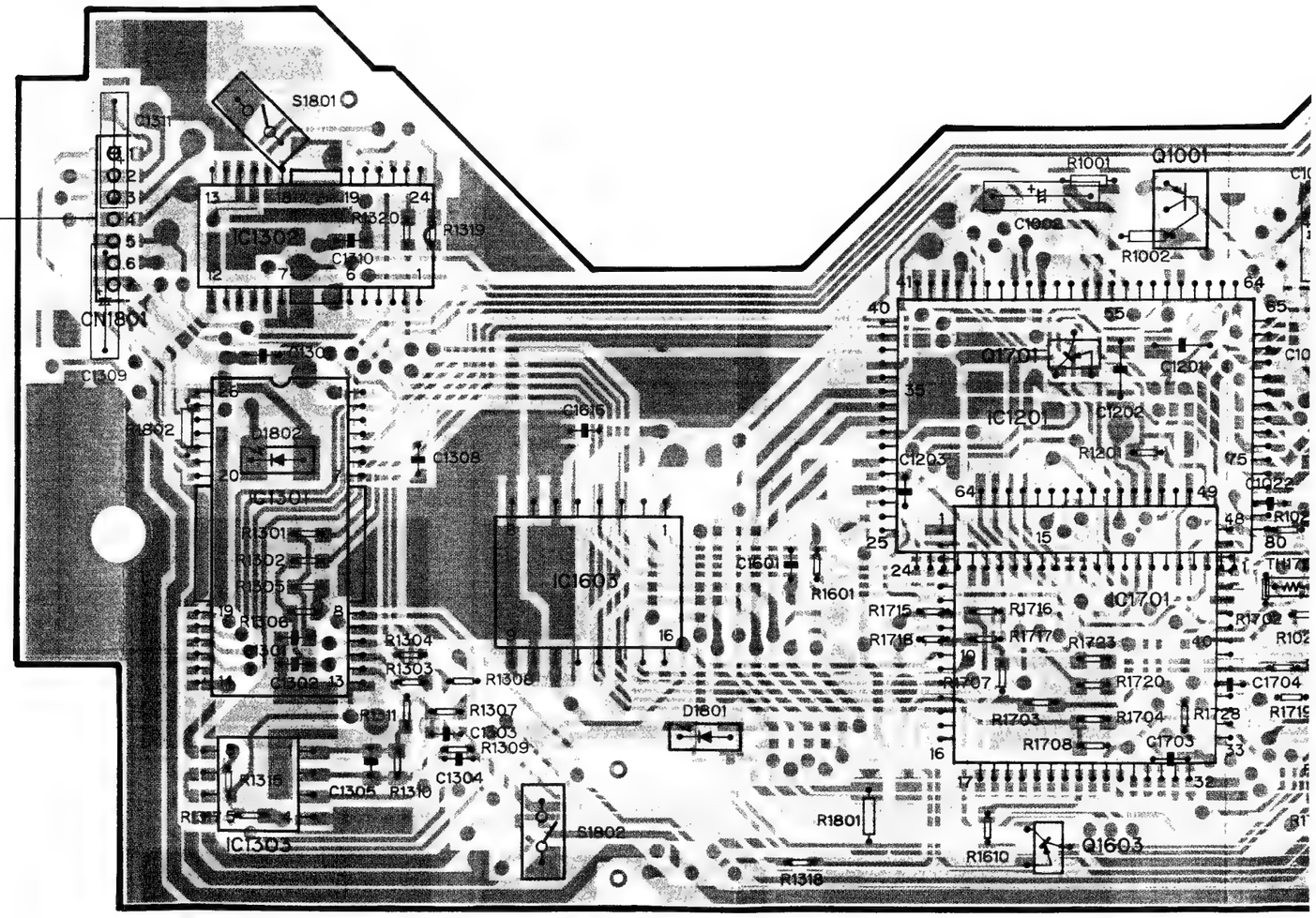


CONTROL UNIT
CN1801

CONTROL UNIT

IC. Q — IC1302, IC1301, IC1303, IC1603, Q1701, Q1603, Q1001, IC1201, IC1701

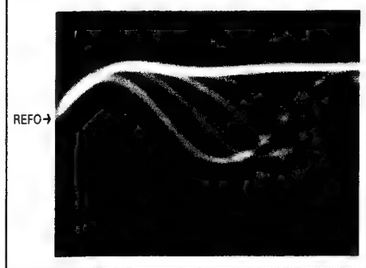
ADJ



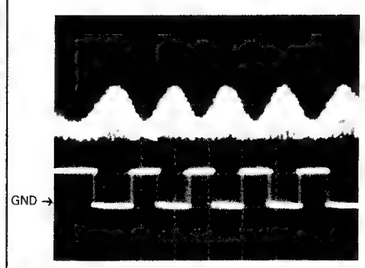
● Wave Forms

Note: 1. The encircled numbers denote measuring pointes in the circuit diagram.
2. Reference voltage
REFO: 2.5V

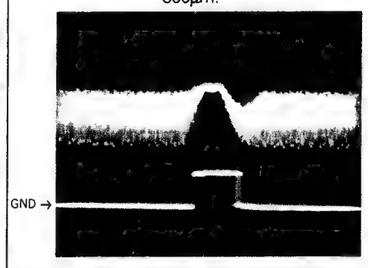
① RFO1 0.5V/div. 0.2μs/div.
Normal mode: play



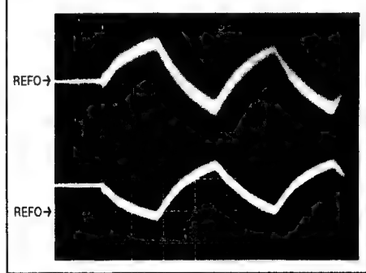
① CH1: RFO1 1V/div.
② CH2: MIRR 5V/div. 0.5ms/div.
Test mode: Tracking open



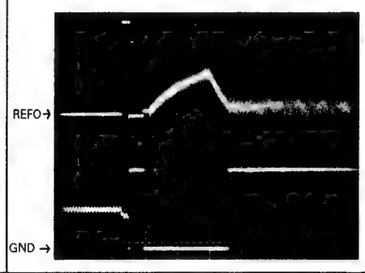
① CH1: RFO1 1V/div.
② CH2: MIRR 5V/div. 0.5ms/div.
Normal mode: The defect part passes 800μm.



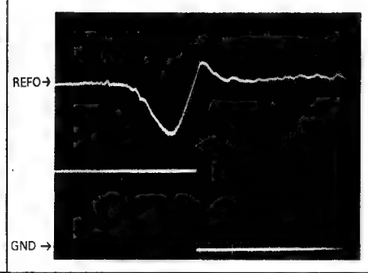
③ CH1: FIN 0.5V/div.
④ CH2: FO+ 2V/div. 0.2s/div.
Test mode: No disc, Focus close



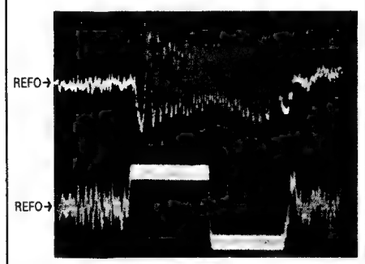
③ CH1: FIN 0.5V/div.
⑤ CH2: FOK 2V/div. 0.2s/div.
Normal mode: Focus close



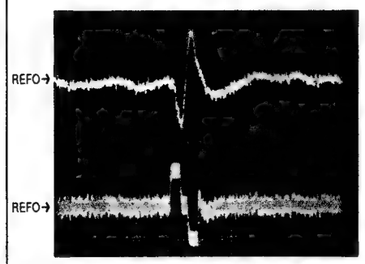
⑥ CH1: FEY1 0.5V/div.
⑦ CH2: XSO 2V/div. 1ms/div.
Normal mode: Focus close



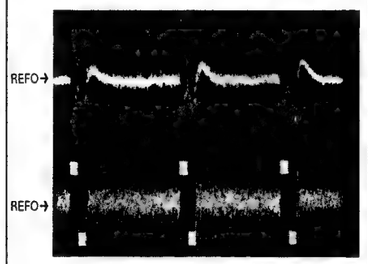
⑧ CH1: TEY1 0.5V/div.
⑨ CH2: TIN 0.5V/div. 0.5ms/div.
Test mode: 32 track jump (FWD)



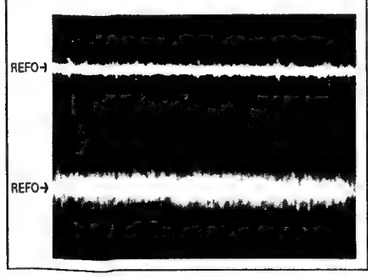
⑧ CH1: TEY1 0.5V/div.
⑨ CH2: TIN 0.5V/div. 0.5ms/div.
Test mode: Single jump (FWD)



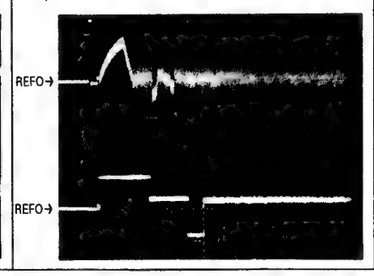
⑧ CH1: TEY1 0.5V/div.
⑨ CH2: TIN 0.5V/div. 5ms/div.
Test mode: 100 track jump (FWD)



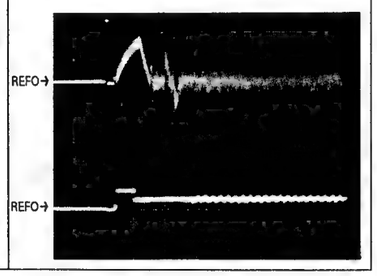
⑥ CH1: FEY 0.2V/div.
③ CH2: FIN 0.5V/div. 20ms/div.
Normal mode: Play



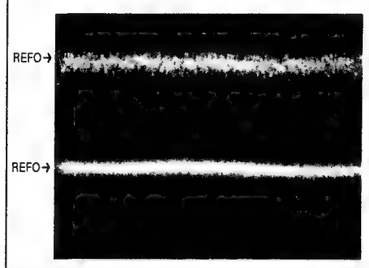
③ CH1: FIN 0.5V/div.
⑩ CH2: SIN 1V/div. 0.5s/div.
Normal mode: Focus close (12cm)



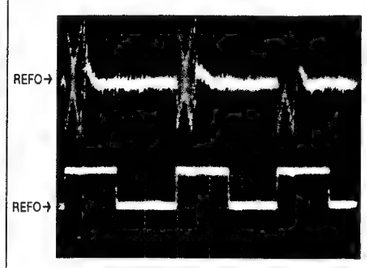
③ CH1: FIN 0.5V/div.
⑩ CH2: SIN 1V/div. 0.5s/div.
Normal mode: Focus close (8cm)



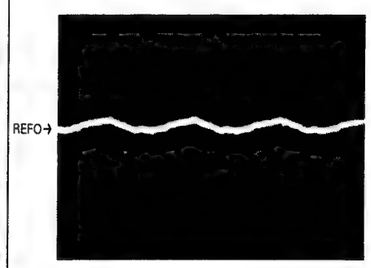
⑧ CH1: TEY1 0.5V/div.
⑨ CH2: TIN 0.5V/div. 20ms/div.
Normal mode: Play



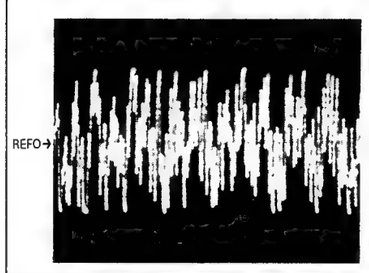
⑧ CH1: TEY1 0.5V/div.
㉓ CH2: CIN 0.5V/div. 5ms/div.
Test mode: 100 track jump (FWO)



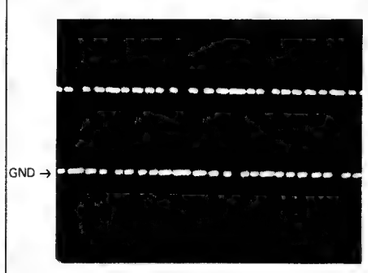
⑩ SIN 0.5V/div. 50ms/div.
Normal mode: Play (12cm disc)



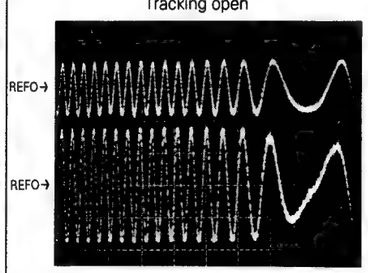
⑩ SIN 0.5V/div. 10ms/div.
Search (12cm disc)



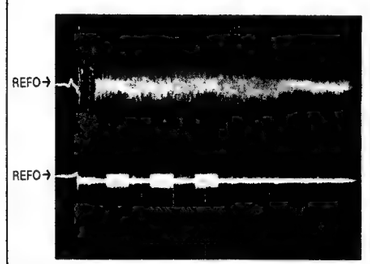
⑪ EFM 2V/div. 5μs/div.
Play



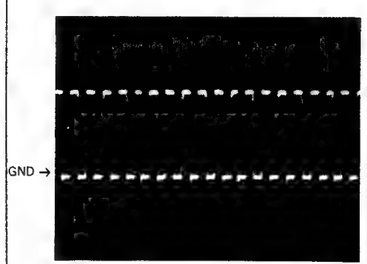
⑧ CH1: TEY1 1V/div.
⑫ CH2: TEC 1V/div. 2ms/div.
Test mode: Focus closed
Tracking open



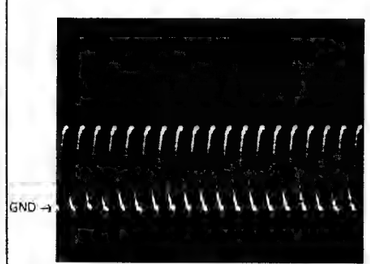
⑧ CH1: TEY1 0.5V/div.
⑥ CH2: FEY 0.5V/div. 0.1s/div.
Normal mode: AGC after focus close



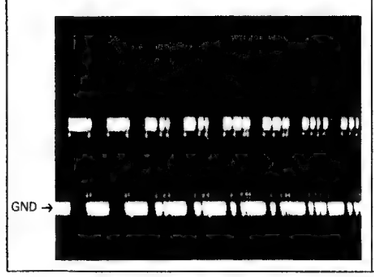
⑮ PLCK 2V/div. 0.5μs/div.
Play



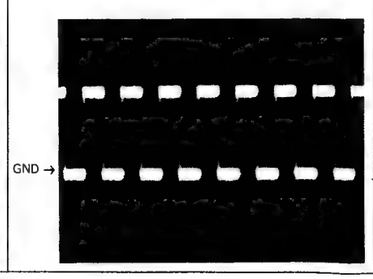
⑯ SCKO 2V/div. 1μs/div.
Play



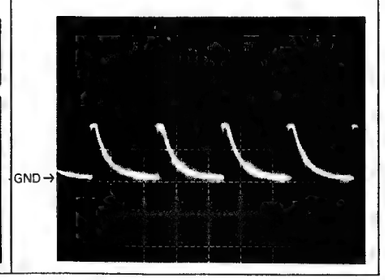
⑰ Dout 2V/div. 10μs/div.
Play



⑱ LRCK 2V/div. 20μs/div.
Play



⑲ VD 5V/div. 50ms/div.
Normal mode: No disc



⑥ CH1: FEY1
③ CH2: FIN
Normal mode

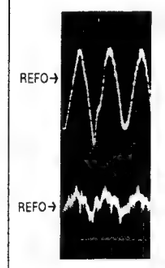


diagram.

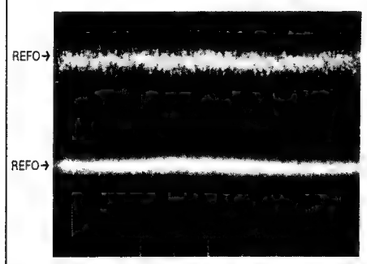
ns/div.
asses

/div.

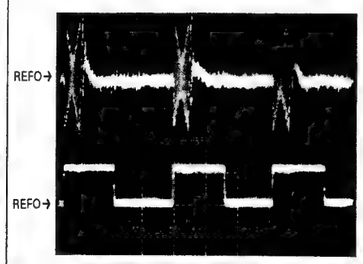
/div.

/div.
)

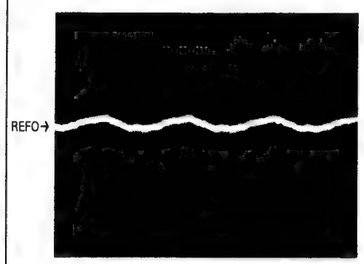
⑧ CH1: TEY1 0.5V/div. 20ms/div.
⑨ CH2: TIN 0.5V/div.
Normal mode: Play



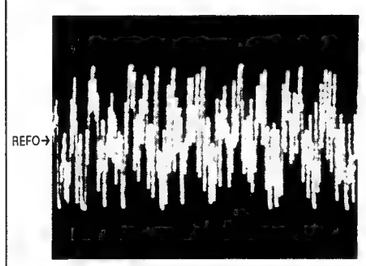
⑧ CH1: TEY1 0.5V/div. 5ms/div.
㉓ CH2: CIN 0.5V/div.
Test mode: 100 track jump (FWO)



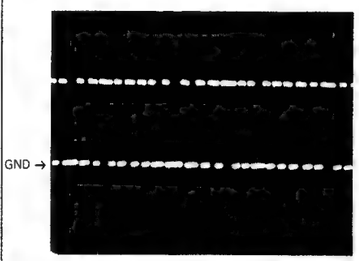
⑩ SIN 0.5V/div. 50ms/div.
Normal mode: Play (12cm disc)



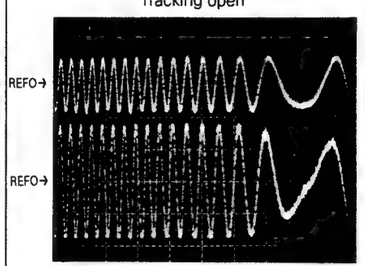
⑩ SIN 0.5V/div. 10ms/div.
Search (12cm disc)



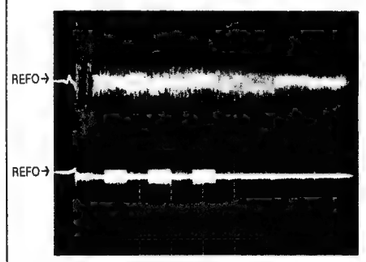
⑪ EFM 2V/div. 5µs/div.
Play



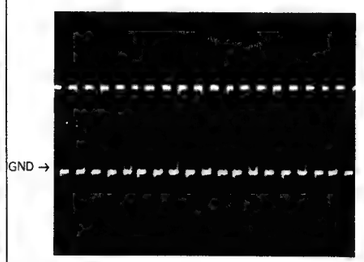
⑧ CH1: TEY1 1V/div. 2ms/div.
⑫ CH2: TEC 1V/div.
Test mode: Focus closed
Tracking open



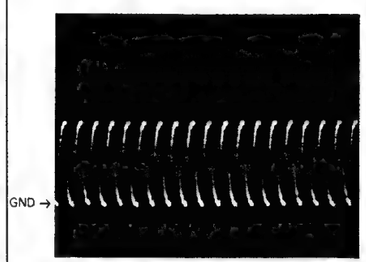
⑧ CH1: TEY1 0.5V/div. 0.1s/div.
⑥ CH2: FEY 0.5V/div.
Normal mode: AGC after focus close



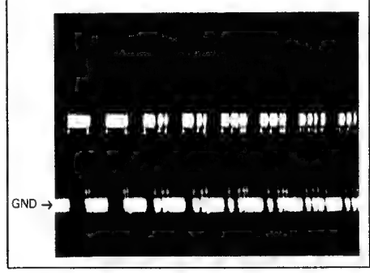
⑮ PLCK 2V/div. 0.5µs/div.
Play



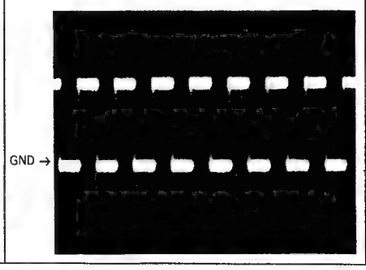
⑯ SCKO 2V/div. 1µs/div.
Play



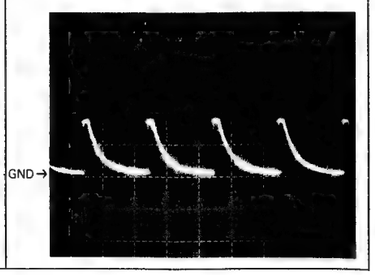
⑰ Dout 2V/div. 10µs/div.
Play



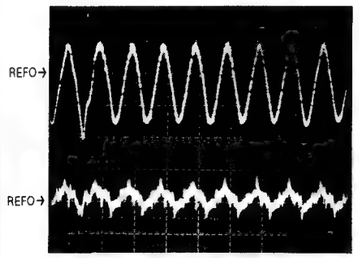
⑱ LRCK 2V/div. 20µs/div.
Play



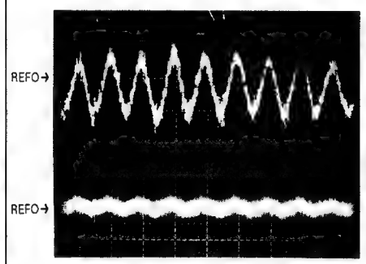
⑲ VD 5V/div. 50ms/div.
Normal mode: No disc



⑥ CH1: FEY1 1V/div. 1ms/div.
③ CH2: FIN 1V/div.
Normal mode: During AGC

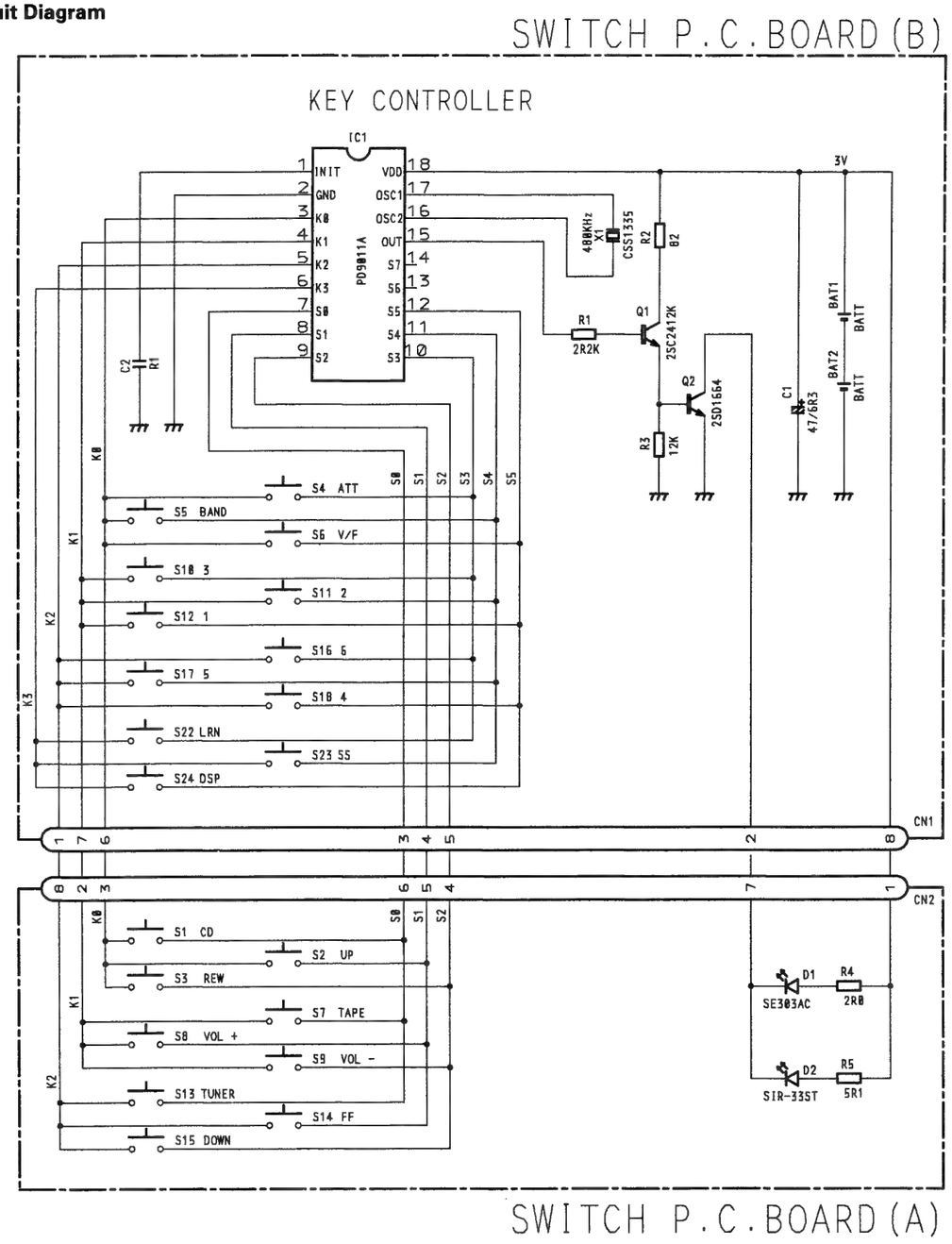


⑧ CH1: TEY1 0.2V/div. 1ms/div.
⑨ CH2: TIN 0.5V/div.
Normal mode: During AGC



12.4 REMOTE CONTROL UNIT

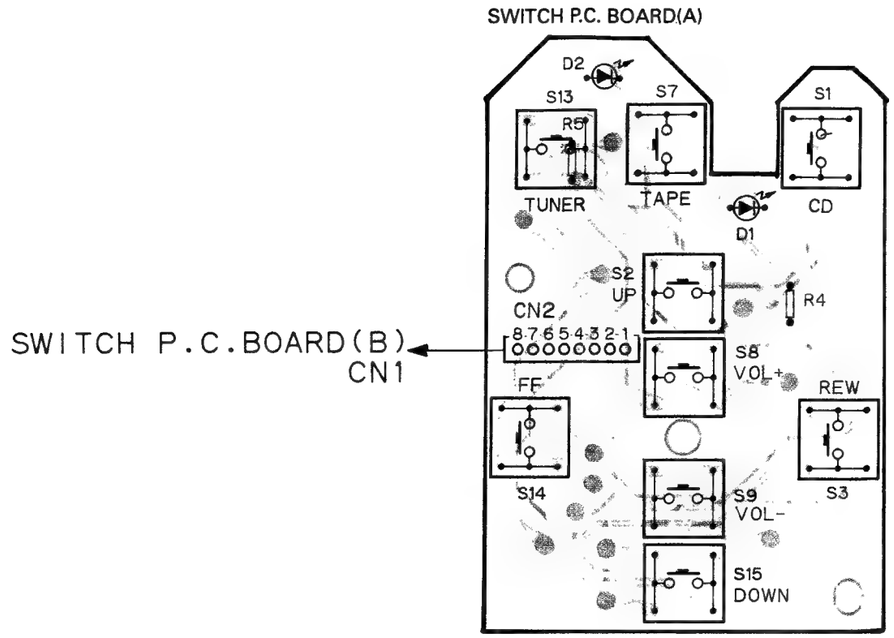
● **Circuit Diagram**



REMOTE CONTROL UNIT
Consists of ·SWITCH P.C.BOARD(A) ·SWITCH P.C.BOARD(B)

Fig.25

● **Connection Diagram**



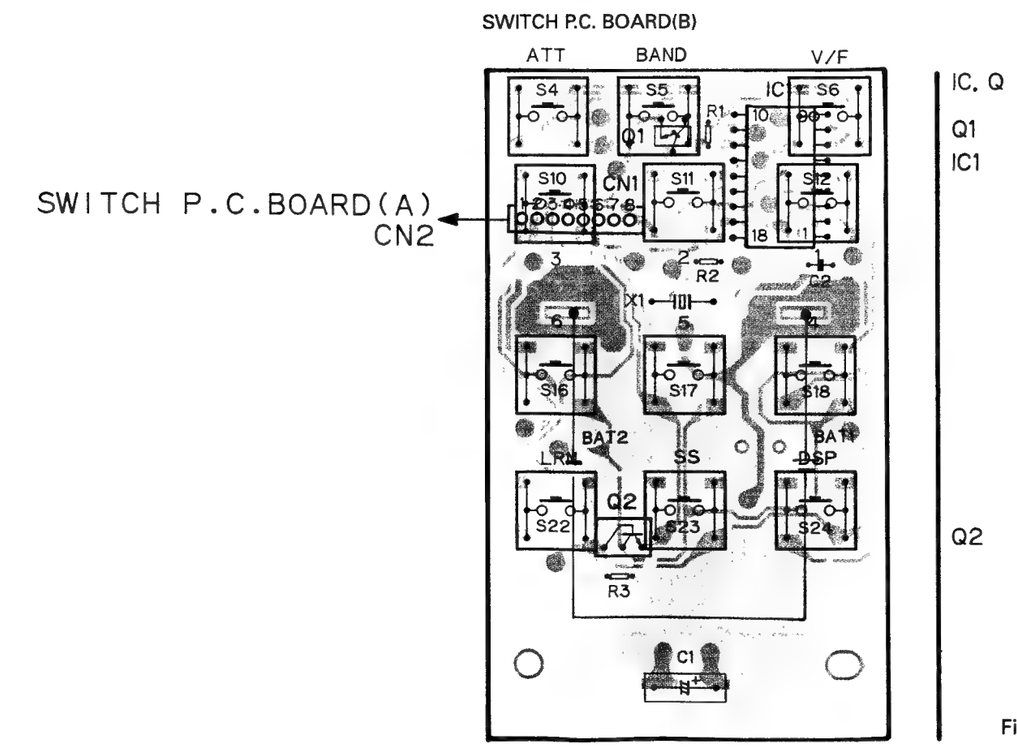


Fig.26

12.5 KEY BOARD UNIT

● **Circuit Diagram**

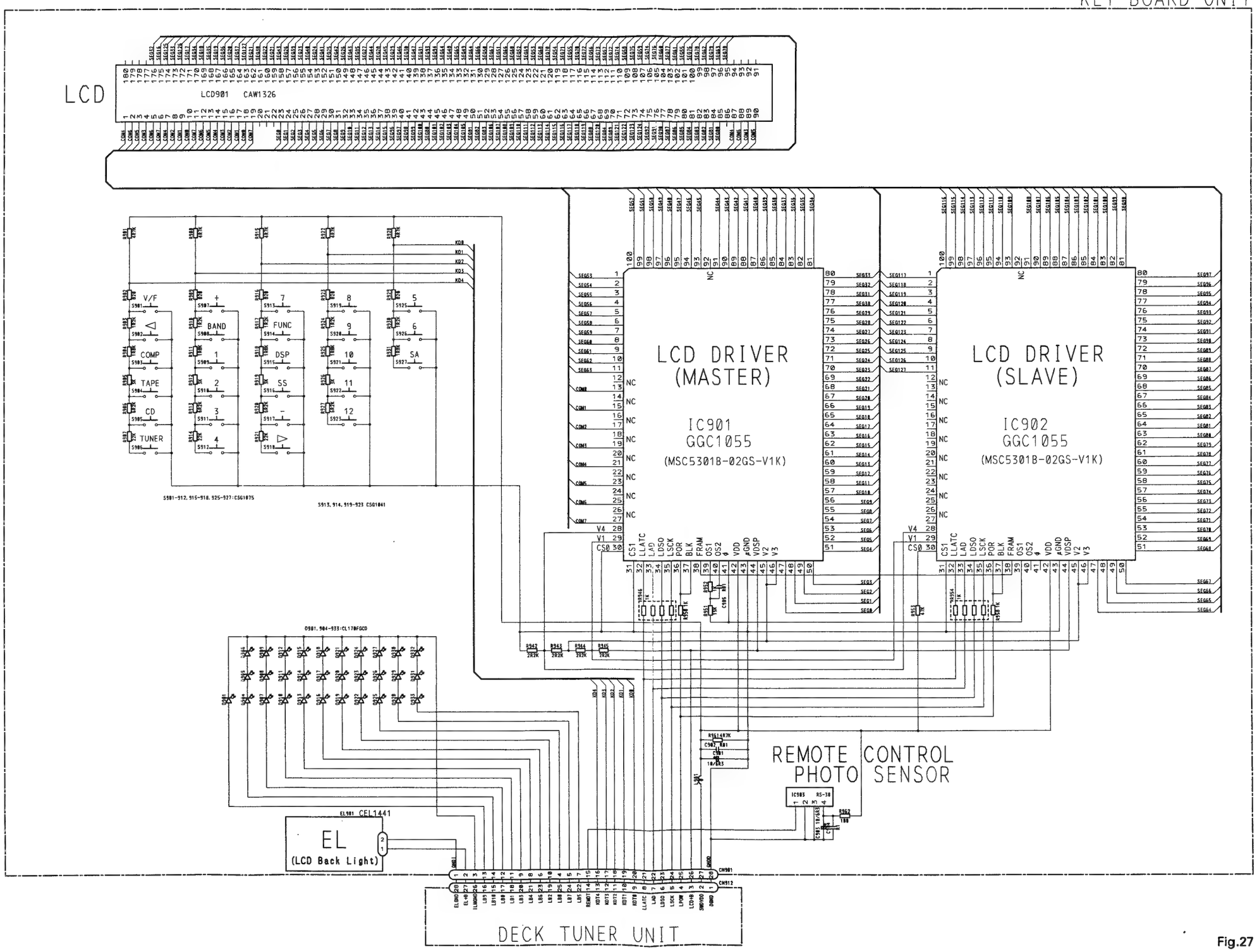


Fig.27

● **Connection Diagram**

IC IC902 IC901 IC903

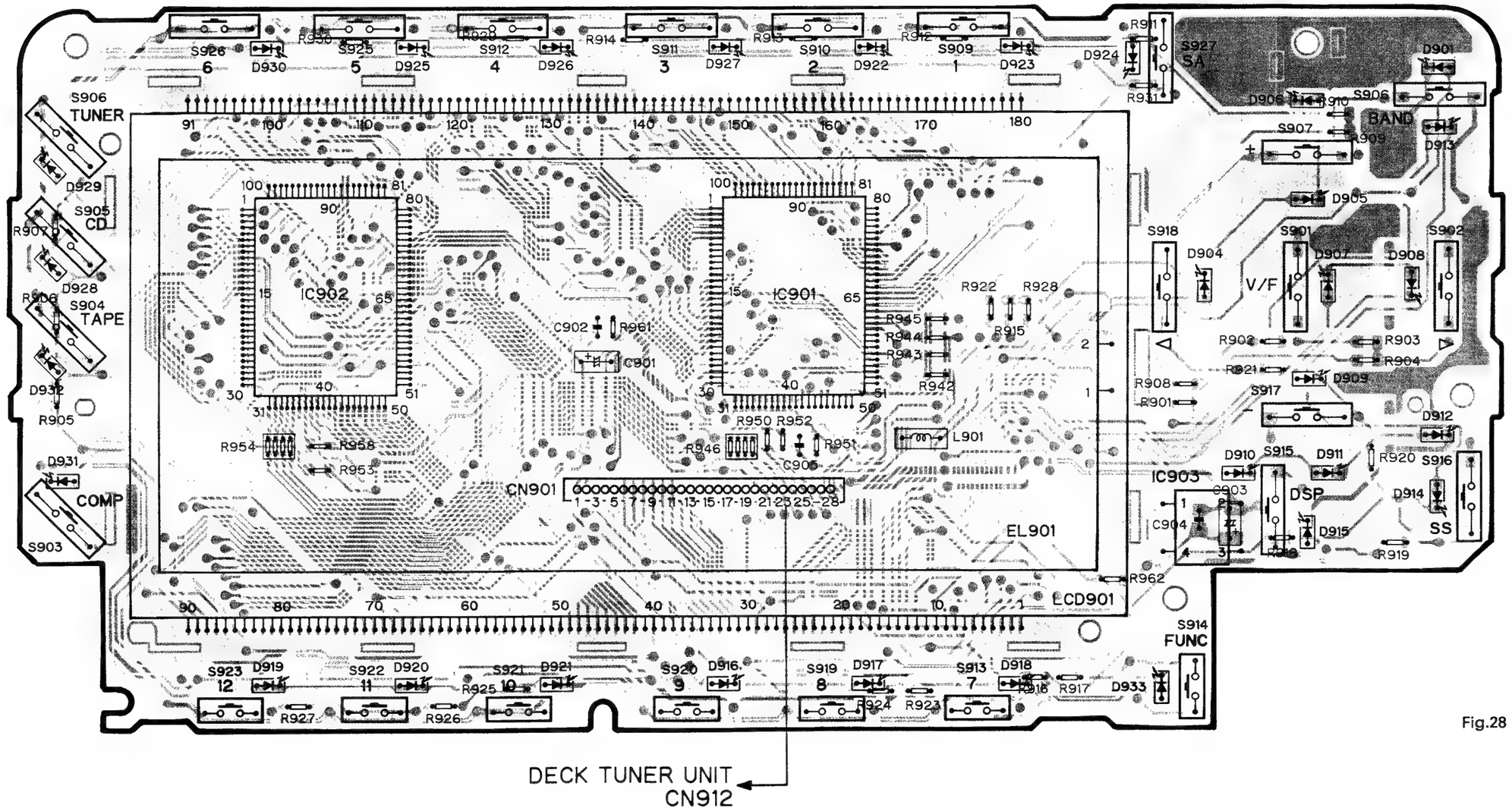
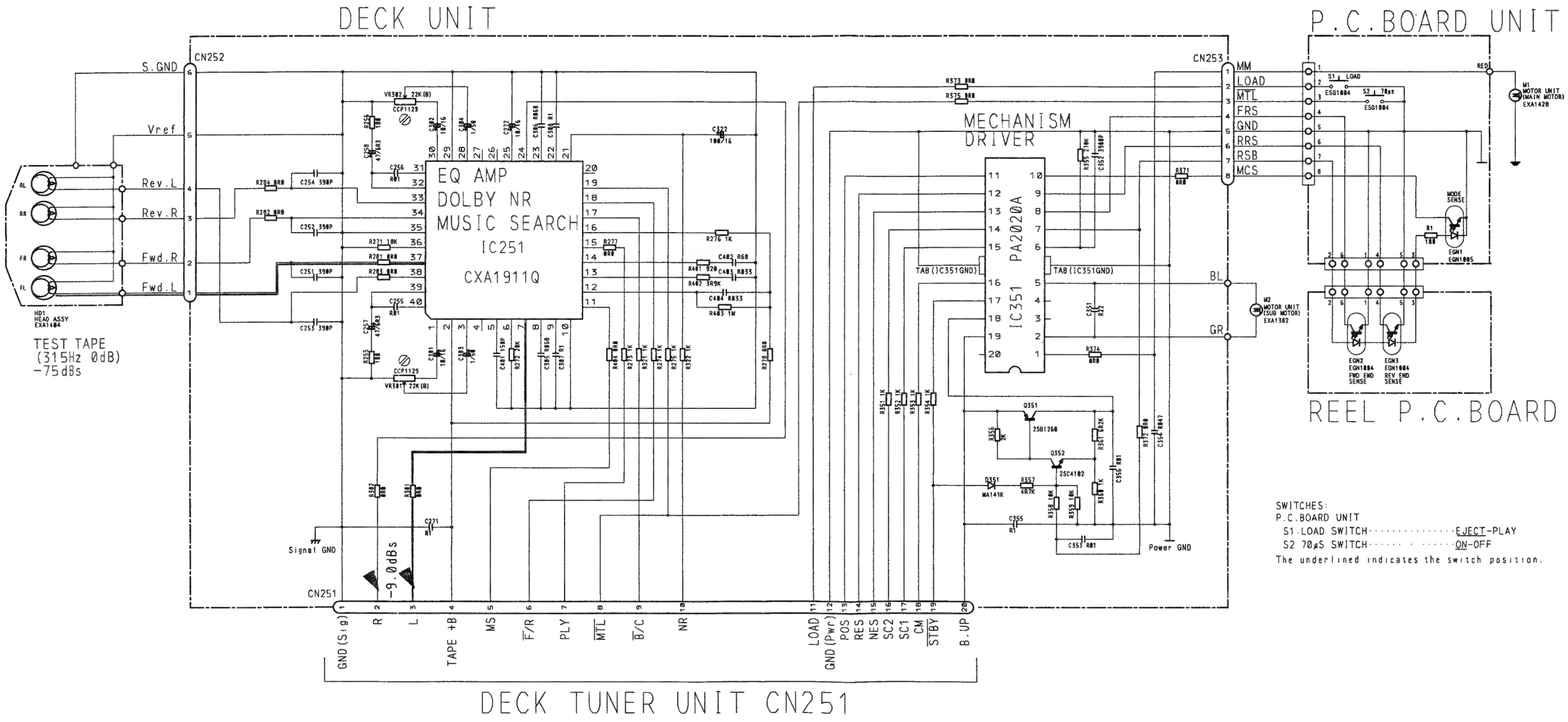


Fig.28

DECK TUNER UNIT
CN912

12.6 CASSETTE MECHANISM MODULE

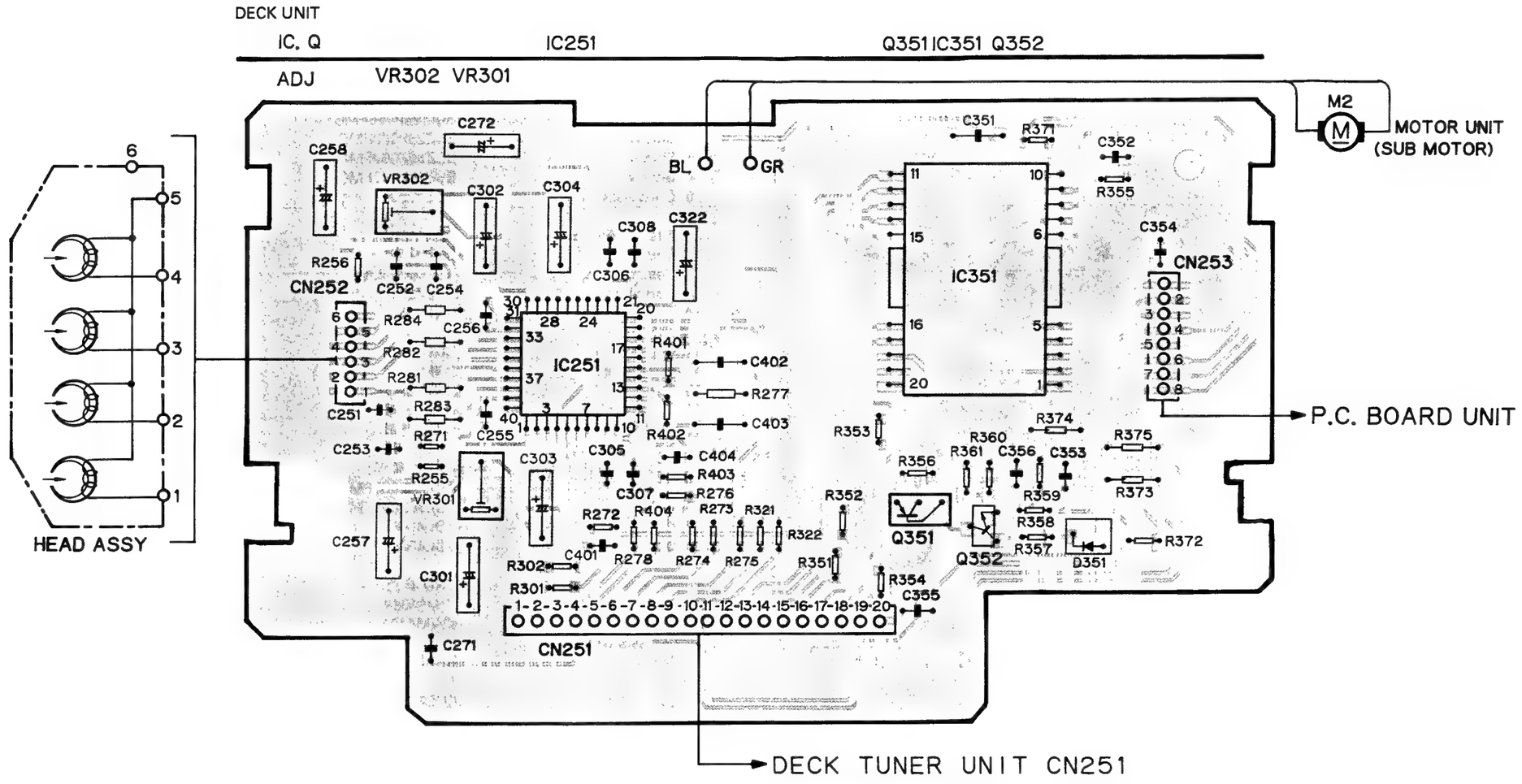
● **Circuit Diagram**

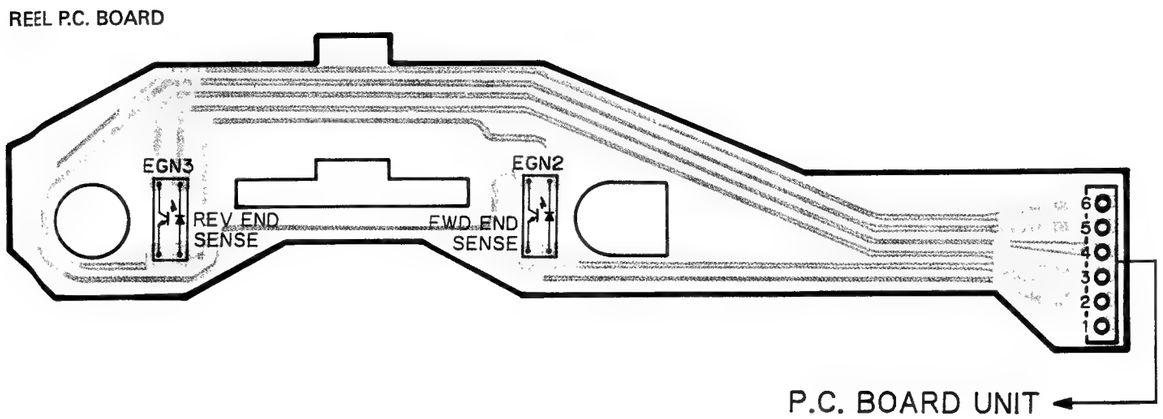


SWITCHES:
P.C.BOARD UNIT
S1 LOAD SWITCH ..... EJECT-PLAY
S2 70μS SWITCH ..... ON-OFF
The underlined indicates the switch position.

Fig.29

● **Connection Diagram**





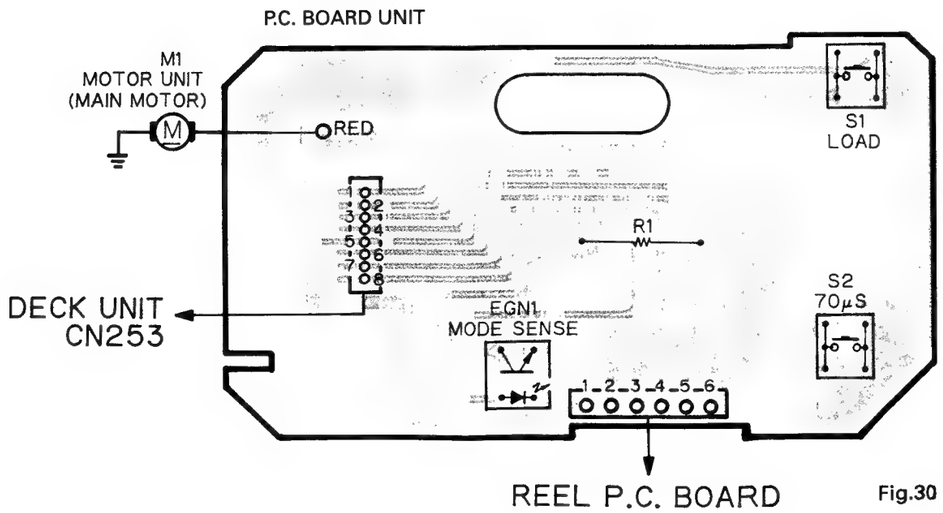


Fig.30

13. EXPLODED VIEW AND PARTS LIST

13.1 CHASSIS

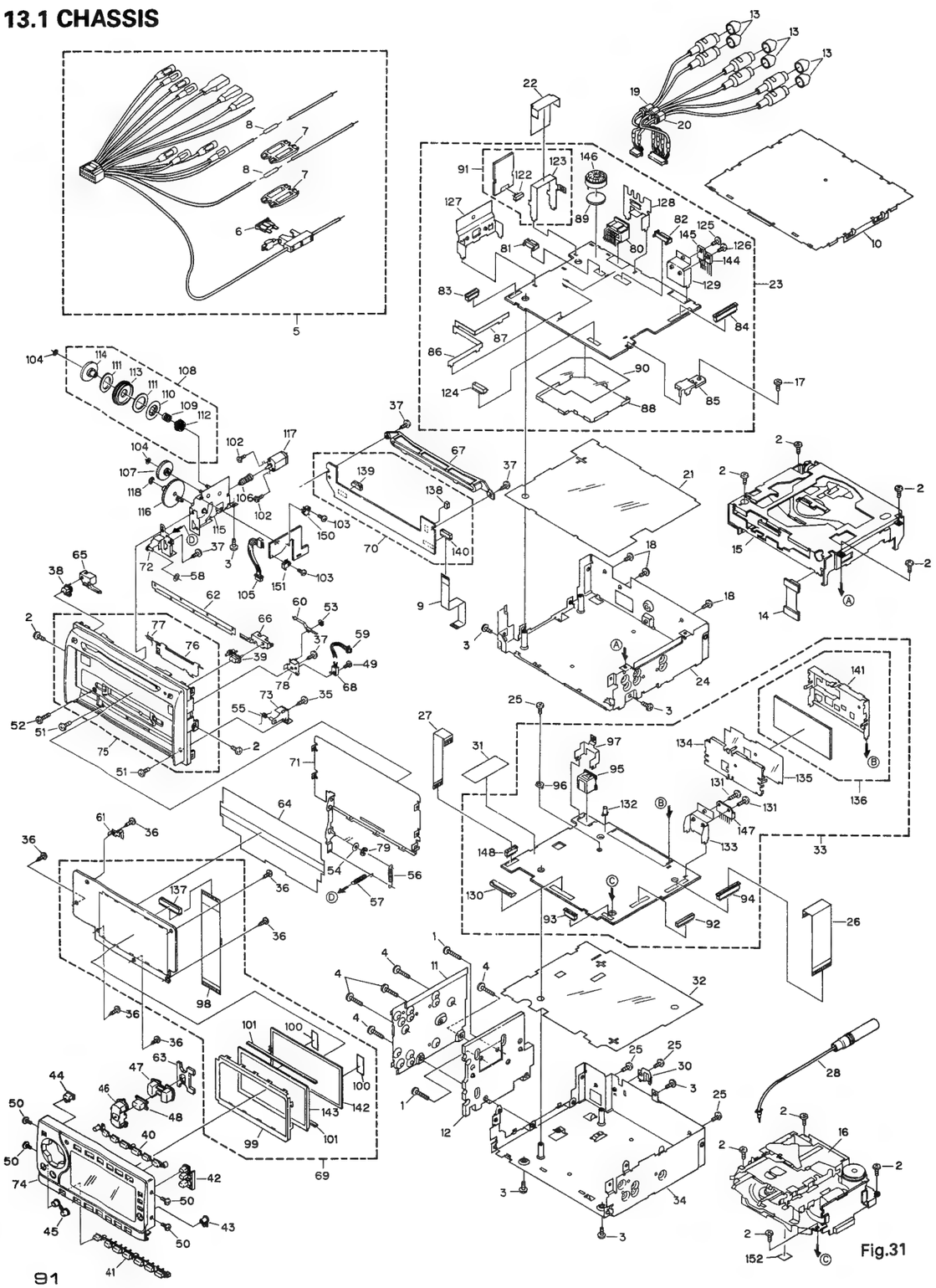


Fig.31

NOTE:

● Parts marked by "＊"are generally unavailable because they are not in our Master Spare Parts List.

● **Parts List**

Mark No	Description	Part No
1	Screw	BMZ26P160FMC
2	Screw	BSZ26P060FMC
3	Screw	BSZ30P060FMC
4	Screw	BSZ30P110FMC
5	Cord Assy	CDE4760
6	Fuse(10A)	CEK1136
7	Cap	CNS1472
8	Resistor	RS1/2P102JL
9	Connector	CDE4811
10	Case	CNB1991
11	Cover	CNC6162
12	Heat Sink	CNR1409
13	Cap	CNV2680
14	Connector Unit	CXA6744
15	CD Mechanism Module	CXK2856
16	Cassette Mechanism Module	EXK3150
17	Screw	BSZ26P080FMC
18	Screw	BSZ30P060FMC
19	Cord	CDE4808
20	Cord	CDE4809
21	Insulator	CNM4525
22	Insulator	CNM4689
23	DSP AMP Unit	CWM4451
24	Chassis Unit	CXA8219
25	Screw	BSZ30P060FMC
26	Connector	CDE4239
27	Connector	CDE4896
28	Antenna Cord	CDH1191
29	·····	
30	Holder	CNC4963
31	Spacer	CNM4058
32	Insulator	CNM4524
33	Deck Tuner Unit	CWM4465
34	Chassis Unit	CXA8218
35	Screw	BPZ20P050FZK
36	Screw	BPZ20P060FMC
37	Screw	BPZ20P080FMC
38	Button(CD-EJECT)	CAC4625
39	Button(OPEN/EJECT)	CAC4626
40	Button(1-6)	CAC4492
41	Button(7-12)	CAC4627
42	Button(TUNER,CD,TAPE)	CAC4494
43	Button(CMP)	CAC4495
44	Button(REL/BAND/F-R)	CAC4497
45	Button(SS,DSP)	CAC4498
46	Button(+,-)	CAC4500
47	Button(◁,▷)	CAC4501
48	Button(V/F)	CAC4502
49	Screw(M1.7x5.5)	CBA1070
50	Screw(M2x3)	CBA1154
51	Screw(M2x4)	CBA1172
52	Screw(M2x12)	CBA1348
53	Washer	CBF-046
54	Washer	CBF1065
55	Spring	CBH1817
56	Spring	CBH1856
57	Spring	CBH1864
58	Spacer	CNV4594
59	Connector	CDE4860
60	Arm	CNC1280
61	Conductor	CNC6365
62	Cover	CNM4369
63	Cushion	CNM4535
64	Insulator	CNM4536
65	Lens	CNV4392
66	Lens	CNV4393
67	Holder	CNV4394
68	Switch(S1)	CSN-088
69	Key Board Unit	CWM4454
70	Switch Unit	CWM4455
71	Holder Unit	CXA8302
72	Bracket Unit	CXA8303
73	Bracket Unit	CXA8304
74	Grille Unit	CXA8959
75	Grille Unit	CXA8635
76	Door	CAT1734
77	Spring	CBH1371
78	Holder Unit	CXA8599
79	Washer	YE20FUC
80	Plug(CN1801)	CKM1187
81	Plug(CN1502)	CKS1238
82	Plug(CN1501)	CKS1242
83	Connector(CN1401)	CKS2242
84	Connector(CN1701)	CKS2258
85	Holder	CNC5013
86	Holder	CNC5303
87	Holder	CNC5450
88	Sheeld	CNC5451
89	Insulator	CNM3634
90	Insulator	CNM4063

Mark	No.	Description	Part No
	91	Trans Unit	CWR1064
	92	Connector(CN251)	CKS1730
	93	Connector(CN913)	CKS2242
	94	Connector(CN1020)	CKS2258
	95	Connector(CN751)	CKS3408
	96	Holder	CNC2218
	97	Holder	CNC6350
	98	Connector	CDE4983
	99	Holder	CNC6177
	100	Film	CNM4872
	101	Connector	CNV4595
	102	Screw(M2x3)	CBA1062
	103	Screw(M1.7x5.5)	CBA1070
	104	Washer	CBF1050
	105	Connector	CDE4858
	106	Gear	CNV2389
	107	Gear	CNV3869
	108	Gear Unit	CXA3406
	109	Spring	CBH1337
*	110	Plate	CNC3240
*	111	Felt	CNM2638
	112	Gear	CNV2459
	113	Gear	CNV2460
*	114	Collar	CNV2478
	115	Holder Unit	CXA8956
	116	Gear Unit	CXA8748
	117	Motor(M1)	CXM1085
	118	Washer	YE20FUC
	119-121	·····	
	122	Plug(CN1802)	CKS1614

Mark	No.	Description	Part No
	123	Holder	CNC6288
	124	Connector(CN1601)	CKS2302
	125	Screw	BSZ30P060FMC
	126	Screw	BSZ30P080FMC
	127	Bracket	CNC6163
	128	Holder	CNC6164
	129	Holder	CNC6165
	130	Connector(CN912)	KP100MB28L
	131	Screw	BSZ30P060FMC
	132	Mini Pin Jack(CN105)	CKX1046
	133	Holder	CNC5291
	134	Holder	CNC5529
	135	Insulator	CNM4383
	136	FM/AM Tuner Unit	CWE1365
	137	Connector(CN901)	KP100MB28L
	138	Connector(CN952)	CKS2191
	139	Connector(CN954)	CKS2194
	140	Connector(CN951)	KP100MC12L
	141	Holder	CNC6523
	142	EL(EL901)	CEL1441
	143	LCD(LCD901)	CAW1326
	144	Transistor(Q1812)	2SD1684
	145	IC(IC1608)	L780S05
	146	Choke Coil(L1801)	CTH1159
	147	IC(IC701)	PA2024A
	148	Connector(CN1010)	CKS2242
	149	·····	
	150	Switch(S999)	CSN1022
	151	Switch(S998)	CSN1022
	152	Cushion	CNM4863

13.2 CASSETTE MECHANISM MODULE

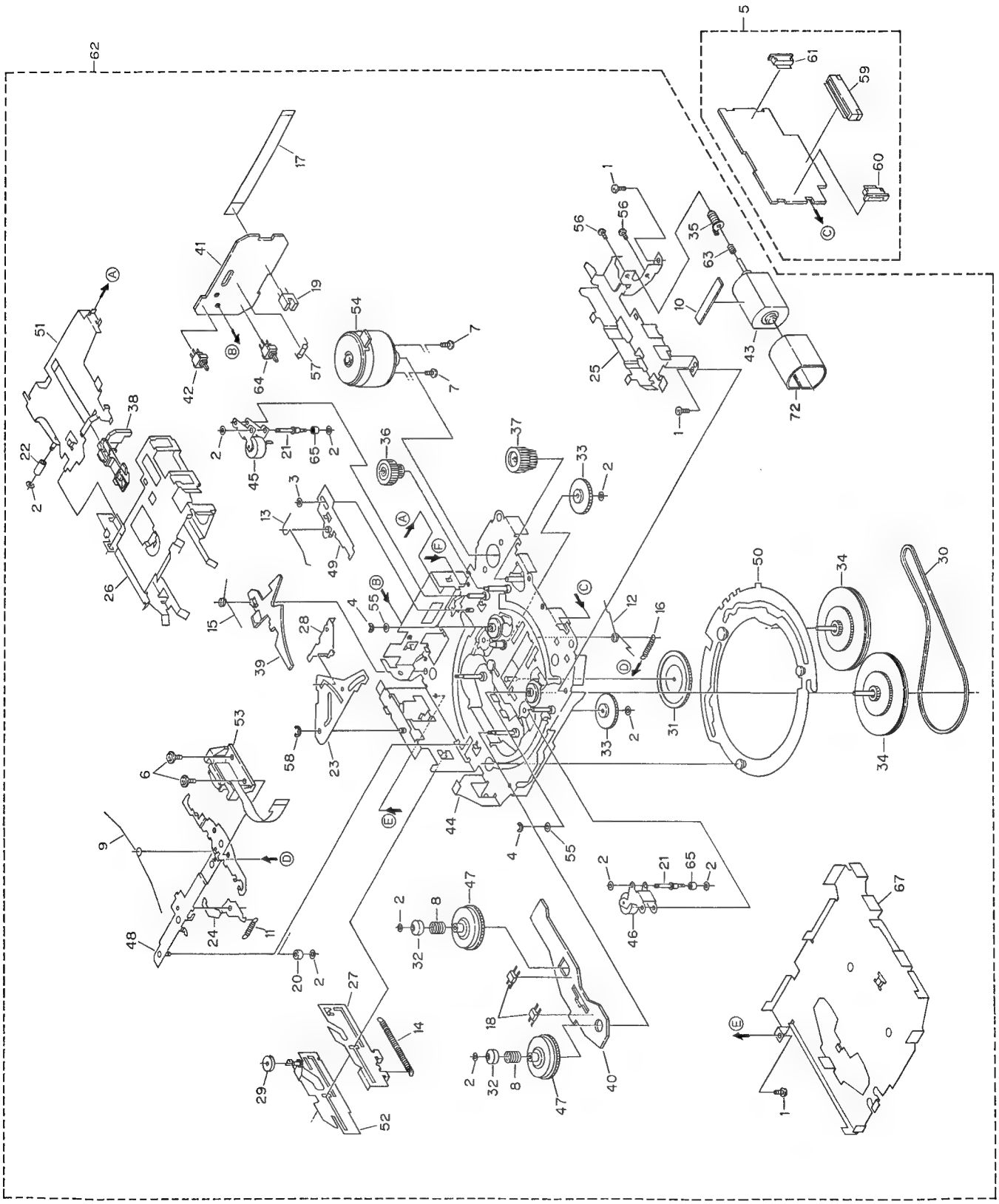


Fig.32

● **Parts List**

Mark No.	Description	Part No.
1	Screw	BSZ20P040FMC
2	Washer	CBF1037
3	Washer	CBF1038
4	Washer	CBG1003
5	Deck Unit	CWM4528
6	Screw	EBA1028
7	Screw	EBA1037
8	Spring	EBH1531
9	Spring	EBH1512
10	Cushion	ENM1034
11	Spring	EBH1515
12	Spring	EBH1516
13	Spring	EBH1517
14	Spring	EBH1518
15	Spring	EBH1519
16	Spring	EBH1537
17	Cord	EDD1015
18	Photo-reflector(EGN2,3)	EGN1004
19	Photo-interrupter(EGN1)	EGN1005
20	Roller	ENR1031
21	Shaft	ELA1362
22	Roller	ELA1348
23	Arm	ENC1396
24	Arm	ENC1397
25	Guide	ENC1398
26	Holder	ENC1417
27	Lever	ENC1418
28	Arm	ENC1401
29	Roller	ENR1027
30	Belt	ENT1027
31	Gear	ENV1347
32	Collar	ENV1349
33	Gear	ENV1350
34	Flywheel	ENV1410
35	Worm Gear	ENV1439
36	Worm Wheel	ENV1440
37	Gear	ENR1028
38	Lever	ENV1442
39	Arm	ENV1445
40	Gathering P.C.Board	ENX1029
41	Gathering P.C.Board	ENX1030
42	Switch(S1)	ESG1004
43	Motor Unit(M2)	EXA1382
44	Chassis Unit	EXA1435
45	Pinch Roller Unit	EXA1384
46	Pinch Roller Unit	EXA1385
47	Reel Unit	EXA1386
48	Head Base Unit	EXA1434
49	Lever Unit	EXA1438
50	Gear Unit	EXA1436
51	Frame Unit	EXA1390
52	Lever Unit	EXA1439
53	Head Assy(HD1)	EXA1404
54	Motor Unit(M1)	EXA1428
55	Washer	HBF-179
56	Screw	JGZ20P025FNI
57	Resistor(R1)	RD1/4HM181J
58	Washer	YE20FUC
59	Connector(CN251)	CKS1711
60	Connector(CN252)	CKS2127
61	Connector(CN253)	CKS2129
62	Spare Unit	EXA3013
63	Spring	EBH1545
64	Switch(S2)	ESG1004
65	Roller	ENR1023
66	·····	
67	Cover	ENC1413
68-71	·····	
72	Sheeld	ENC1410

13.3 CD MECHANISM MODULE

● **Parts List**

Mark No.	Description	Part No.
1	Screw	PMS26P040FMC
2	Control Unit	CWX1910
3	Connector(17P)(CN1001)	CKS1955
4	Connector(20P)(CN1701)	CKS2150
5	Connector(18P)(CN1002)	CKS2811
6	Connector(7P)(CN1801)	CKS2196
7	CD Mechanism Unit	CXA7200
8	Screw	BMZ20P030FMC
9	Screw	BSZ20P040FMC
10	Screw(M2×2)	CBA1250
11	Screw(M2×3)	CBA107
12	Screw(M2×6)	CBA123
13	Screw(M2×5)	CBA129
14	Washer	CBF103
15	Washer	CBF106
16	Spring	CBH141
17	Spring	CBH141
18	Spring	CBH141
19	Spring	CBH174
20	Spring	CBH142

Mark	No.	Description	Part No.
	21	Spring	CBH1457
	22	Spring	CBH1552
	23	Spring	CBH1553
	24	Spring	CBH1554
	25	Spring	CBH1665
	26	Spring	CBH1556
	27	Spring	CBH1789
	28	Spring	CBH1558
	29	Spring	CBH1664
	30	Spring	CBH1560
	31	Spring	CBH1576
	32	Spring	CBH1577
	33	Spring	CBH1666
	34	Spring	CBH1583
	35	Spring	CBH1628
	36	Spring	CBL1170
	37	Spring	CBL1171
	38	Spring	CBL1200
	39	Connector	CDE4543
	40	PU Unit	CGY1031
	41	Shaft	CLA2220
	42	Roller	CLA2255
	43	Shaft	CLA2256
	44	Frame	CNC5661
	45	Arm	CNC5565
	46	Lever	CNC4891
	47	Lever	CNC4892
	48	Bracket	CNC4893
	49	Arm	CNC4895
	50	Arm	CNC5566
	51	Bracket	CNC5424
	52	Spacer	CNM3315
	53	Holder	CNV4018
	54	Sheet	CNM3693
	55	Bracket	CNM3917
	56	Belt	CNT1053
	57	Clamper Unit	CXA6999
	58	Guide	CNV2891
	59	Holder	CNV3276
*	60	Roller	CNV3412
	61	Damper	CNV3974
	62	Arm	CNV3565
	63	Arm	CNV3992
	64	Gear	CNV3567
	65	Gear	CNV3568

Mark	No.	Description	Part No.
	66	Gear	CNV3569
	67	Gear	CNV3570
	68	Arm	CNV3571
	69	Holder	CNV3572
	70	Gear	CNV3573
	71	Holder	CNV3574
	72	Holder	CNV4067
	73	Holder	CNV3576
	74	Rack	CNV3577
	75	Arm	CNV3578
	76	Plate	CNV3629
	77	Guide	CNV3694
	78	Gathering P.C.Board	CNX2103
	79	P.C.Board	CNP4230
	80	Screw Unit	CXA2375
	81	Motor Unit(M2)	CXA7150
	82	Chassis Unit	CXA7196
	83	Arm Unit	CXA5603
	84	Arm Unit	CXA5604
	85	Bracket Unit	CXA5605
	86	Lever Unit	CXA7197
	87	Arm Unit	CXA5607
	88	Arm Unit	CXA5608
	89	Gear Unit	CXA8809
	90	Motor Unit(M1)	CXA7001
	91	Bracket Unit	CXA5938
	92	Frame Unit	CXA6192
	93	Motor Unit(M3)	CXA6456
	94	Screw	JFZ17P035FNI
	95	Screw	JFZ20P014FMC
	96	Screw	JFZ20P020FZK
	97	Screw	JFZ20P025FMC
	98	Photo-transistor(P1,2)	PT4800
	99	Washer	YE15FUC
	100	Washer	YE20FUC
	101	Screw	JGZ20P020FZK
	102	Sheet	CNM4028
	103	Spring	CBH1710
	104	Spacer	CNC5436
	105	Screw	JFZ20P045FMC
	106	Washer	CBF1061
	107	Screw	JGZ17P025FZK
	108	·····	
	109	Cushion	CXX1136

● CD Mechanism Module

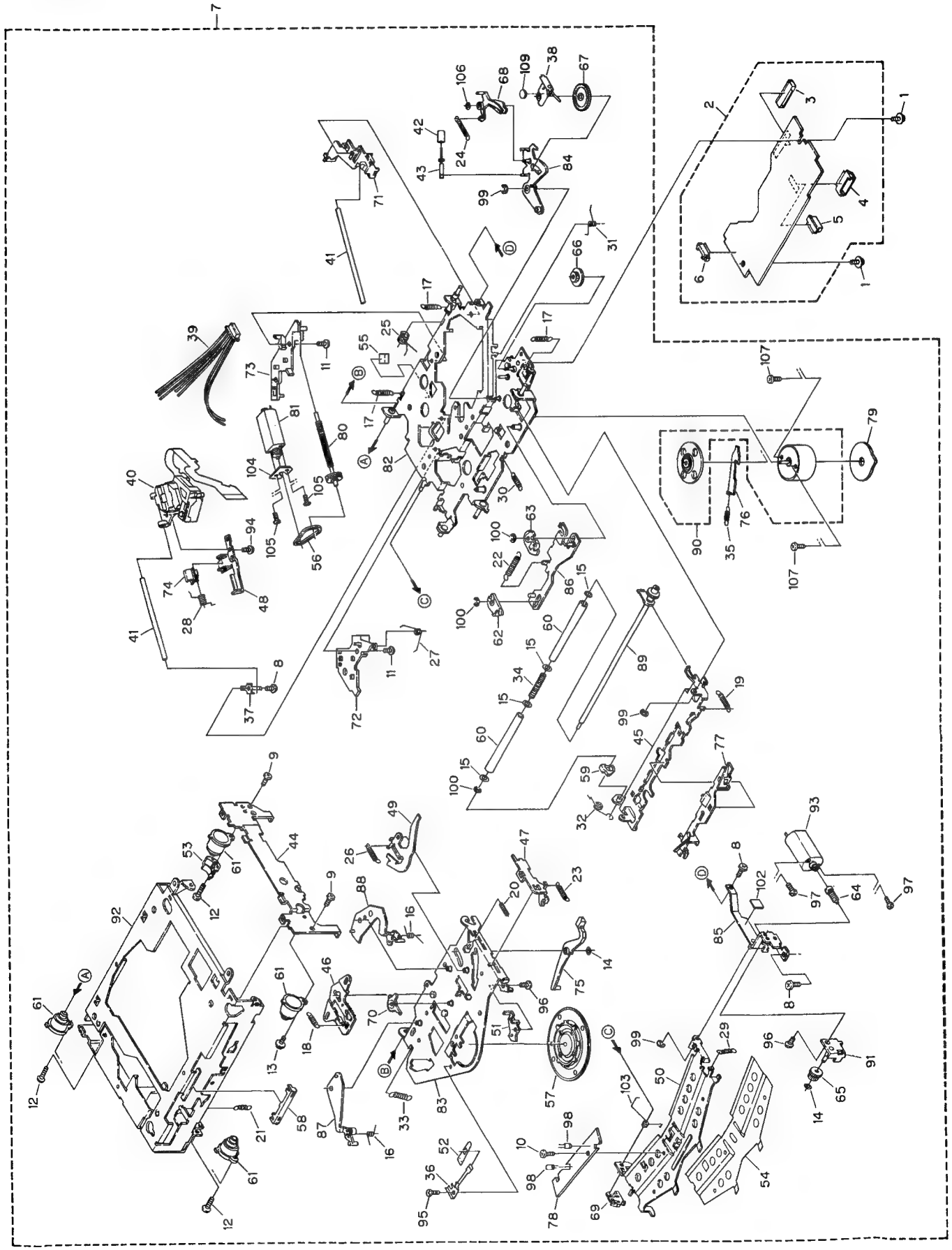


Fig.33

13.4 REMOTE CONTROL ASSY

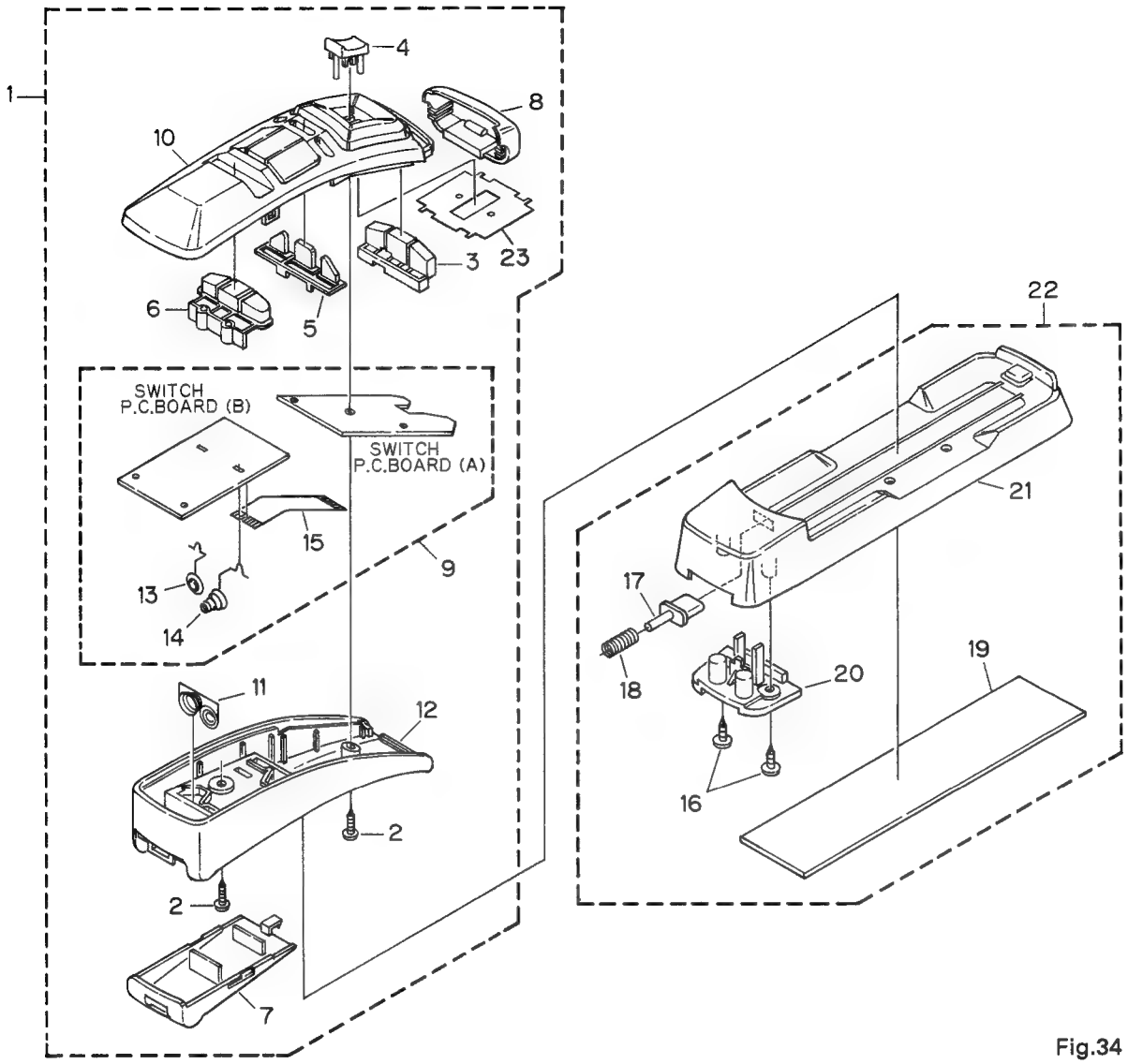


Fig.34

● Parts List

Mark No.	Description	Part No.
1	Remote Control Assy	CXA8589
2	Screw	BPZ20P080FZK
3	Button	CAC4567
4	Button(VOL+-)	CAC4568
5	Button	CAC4453
6	Button	CAC4569
7	Cover	CNS3798
8	Filter	CNS4023
9	Remote Control Unit	CNM4651
10	Grille Unit	CXA8590

Mark No.	Description	Part No.
11	Spring	CBH1796
12	Cover	CNS3797
13	Spring	CBH1716
14	Spring	CBH1717
15	Connector	CDE4759
16	Screw	BPZ30P080FZK
17	Button	CAC4140
18	Spring	CBH1711
19	Sheet	CNM3718
20	Cover	CNS3240
21	Grille	CNS3239
22	Base Assy	CXA7617
23	Sheet	CNM4864

14. PACKING METHOD

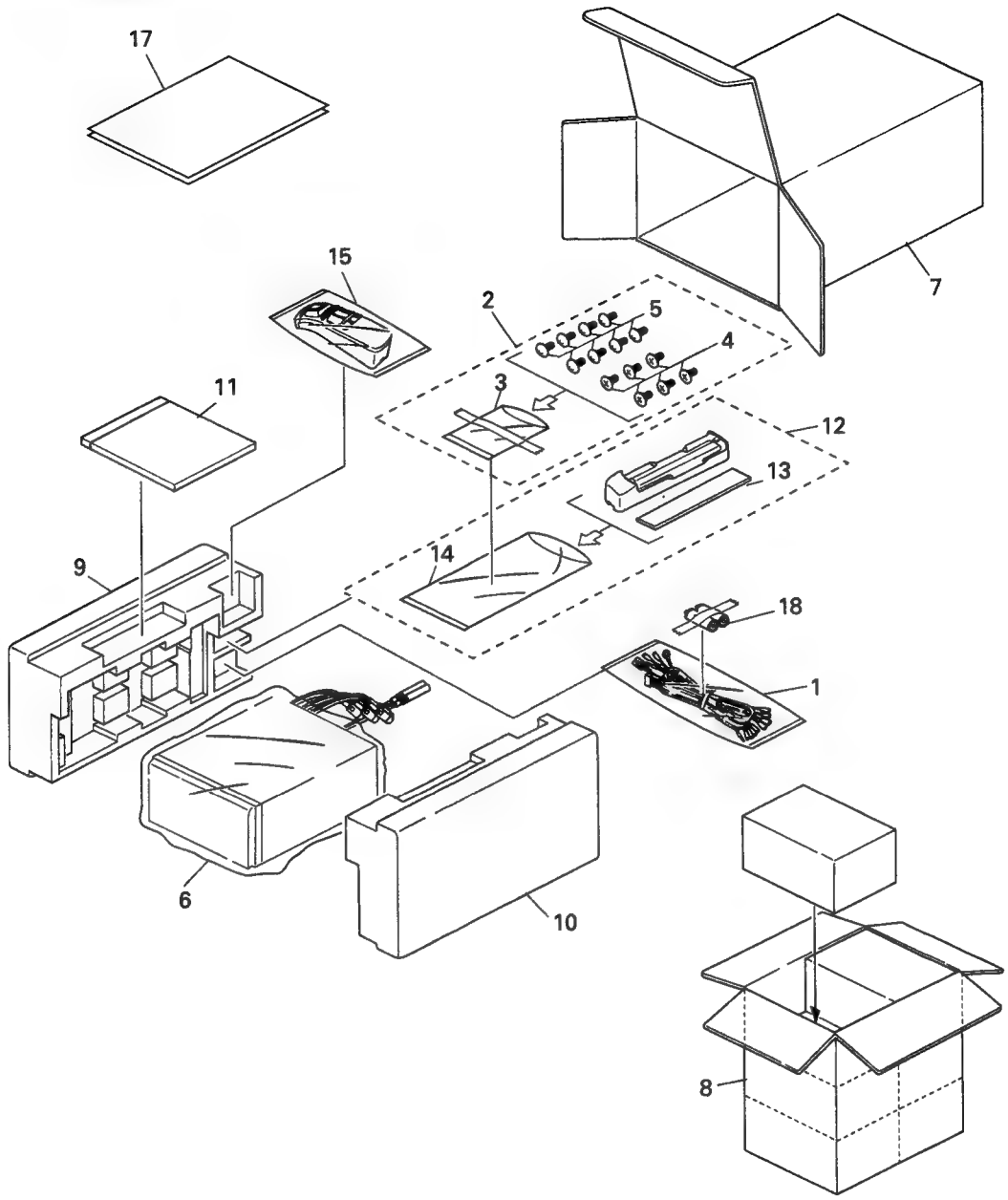


Fig.35

● **Parts List**

Mark	No.	Description	Part No.
	1	Cord Assy	CDE4760
	2	Accessory Assy	CEA1991
*	3	Polyethylene Sheet	CNM4338
	4	Screw	CRZ50P090FMC
	5	Screw	TRZ50P080FMC
	6	Cover	CEG1074
	7	Carton	CHG2829
	8	Contain Box	CHL2829
	9	Protector(L)	CHP1755
	10	Protector(R)	CHP1756
	11	CD	CPJ1004
	12	Base Assy	CXA7617
	13	Sheet	CNM3718
	14	Polyethylene Bag	CEG1011
	15	Remote Control Assy	CXA8589
	15-1	Polyethylene Bag	CEG1011
	16	Battery	CEX1006
	17-1	Owner's Manual (English)	CRB1366
	17-2	Owner's Manual (Spanish)	CRB1373

4173

PIONEER
The Art of Entertainment

Service Manual

ORDER NO.
CRT1574

CD MECHANISM MODULE

CX-540

- **This service manual describes operation of the CD mechanism incroporated in models listed in the table below.**
- **When performing repairs use this manual together with the specific manual for model under repair.**

Model	Service Manual	CD Mechanism Module	CD Mechanism Unit
DEH-605RDS/EW,X1B/EW	CRT1563	CXK2810	CXA6475
DEH-505SDK/GR			
DEH-505/EW,X1B/EW			
DEH-405SDK/GR			
DEH-505/UC	CRT1570	CXK2800	CXA5970
DEH-503/ES			
DEH-45/UC			
DEH-405/UC			
DEH-305/US			
DEH-303/ES			
DEH-205/UC			
DEH-203/ES			

CONTENTS

PIONEER ELECTRONIC CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan
PIONEER ELECTRONICS SERVICE INC. P.O.Box 1760, Long Beach, California 90801 U.S.A.
PIONEER ELECTRONICS OF CANADA, INC. 300 Allstate Parkway Markham, Ontario L3R 0P2 Canada
PIONEER ELECTRONIC [EUROPE] N.V. Haven 1087 Keetberglaan 1, 9120 Melsele, Belgium
PIONEER ELECTRONICS AUSTRALIA PTY.LTD. 178-184 Boundary Road, Braeside, Victoria 3195, Australia TEL:[03]580-9911

K-FFK.FEB. 1994 Printed in Japan

4173

1. CIRCUIT DESCRIPTION

1.1 PRE-AMPLIFIER STAGE (IC1001 UPC2571GS)

The optical signals are converted to voltage signals using an i/v amplifier inside the PU unit.
These voltage signals (A - F) are further processed by this pre-amp stage.
The pre-amplifier performs the following tasks

> Automatic power control of the PU unit's laser diode.
> Generation of an equalized RF signal from the photo-detector outputs (A - D).
> Generation of a focus error signal from the photo-detector outputs (A - D).
> Generation of a tracking error signal from the photo-detector outputs (E & F).
> Generation of a tracking zero crossing signal from the photo-detector outputs (E & F).

This IC runs from a single voltage supply (+5V). The reference voltage for this IC, the PU unit, and all the servo circuitry is REFO. This is obtained from pin 19 of the pre-amp ; which in turn is derived from the output REFOUT of the servo LSI, IC1201, UPD63700GF. The voltages REFOUT and REFO should be at +2.5V DC with respect to GND. All measurements and observations should be made using REFO as the reference as this is a buffered output. Care should be taken not to inadvertently short REFO to GND.

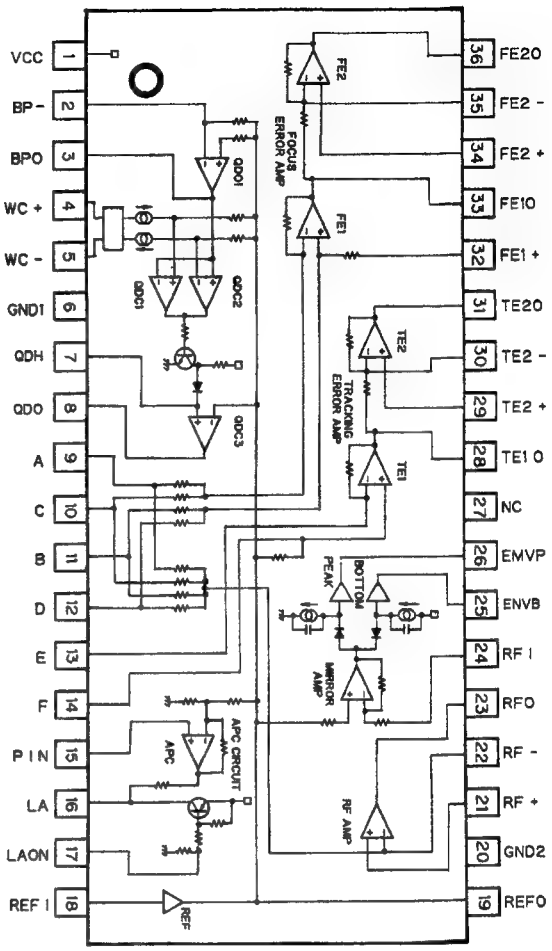


Fig.1 : UPC2571GS BLOCK DIAGRAM

1) Automatic Power Control (APC)

The laser diode's junction voltage varies greatly with temperature ; causing large output variations in optical power. To avoid this, a monitor diode is used in a feedback circuit to keep the optical power constant. As two different manufacturer's laser diodes are used the LD current falls into two broad bands : approx. 40mA and approx. 60mA.

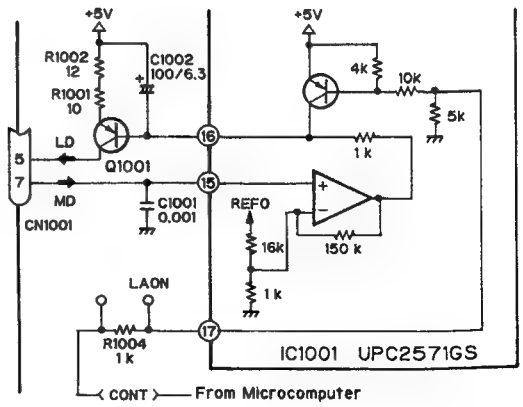


Fig.2 : APC CIRCUIT

2) RF Amplifier

This performs a simple summation of the photo-detector outputs A,B,C & D, amplifies, and equalizes to produce the RF signal at RFO. The RF eye pattern may be monitored here. The RFO OFFSET volume is used to ensure that the RFO waveform has the correct offset relative to the FOK threshold level inside the servo LSI UPD63700GF. The FOK signal is used in the focus close sequence, and during play to control the defect circuit inside the UPD63700GF.

The AC coupled RFO signal, RFI, is used by the UPD63700GF to generate the EFM signal which is used in turn by the DSP spindle CLV control sections.

For low frequency signals :

VRFO = (A+B+C+D) x (R1018+R1019)/10k = (A+B+C+D) x 6.22

The RFO waveform should have an amplitude of approx. 1.9Vpp, with it's upper envelope at +1.1V DC w.r.t. REFO.

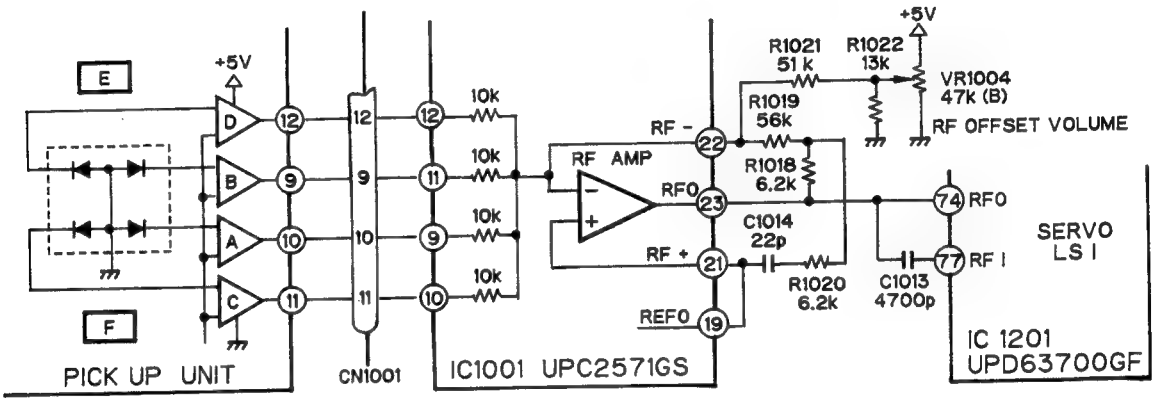


Fig.3 : RFO AMPLIFIER

3) Focus Error Amplifier

This produces a focus error signal used as the basis for the focus servo.

VFEY = ((A+C)-(B+D)) x 5 x (R1007//20k)/10k

= FE x 6.23 (FE = PU unit focus error)

The S-Curve at FEY should have an amplitude of approx. 1.9Vpp.

The second amplifier stage is also a low pass filter, fc=11kHz, and has a bias volume adjustment. This adjustment is used to vary the reference bias level of the focus servo loop and is adjusted to obtain an optimum eye pattern at RFO.

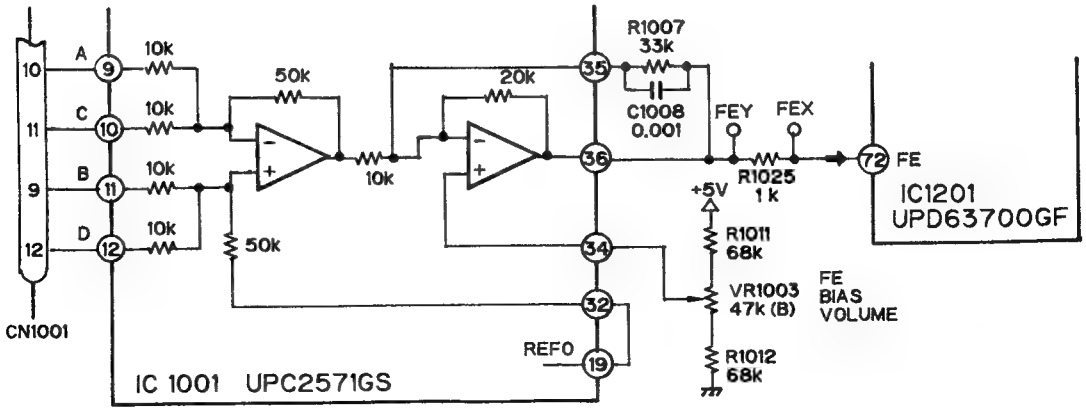


Fig.4 : FOCUS ERROR AMPLIFIER

4) Tracking Error Amplifier

This produces the tracking error signal used in the tracking servo loop.

VTEY = (25 x E) - (25 x F x 2 x 10k / (T.BAL+10k))

Normally, the sensitivity of E & F are the same and T.BAL=10k

=> VTEY = 25 x (E-F)

If, however, the E and F sensitivities are different the T.BAL volume can be used to cancel out the unbalance. The offset adjustment TE OFFSET is to cancel any DC offsets from the photo-detectors or op-amps to ensure the reference bias for the servo loop is at zero. Maladjustment of either of these pre-sets will result in poor tracking performance and susceptibility to skipping.

For a typical unit, the TEY level should be approx. 1.8 Vpp.

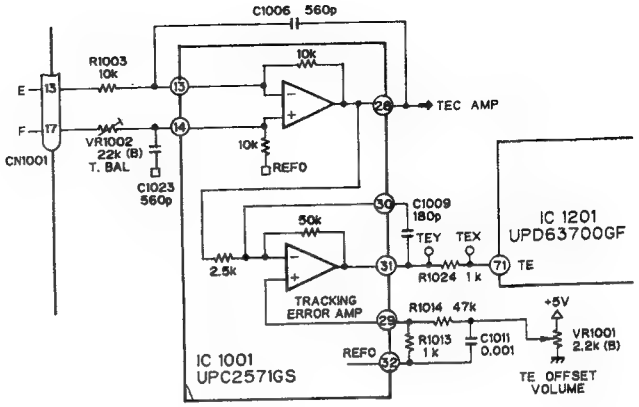


Fig.5 : TRACKING ERROR AMPLIFIER

5) Tracking Zero Crossing Amplifier

TEC1 is basically an amplified, AC coupled, version of the TEY waveform. It is used by the servo LSI IC1201, UPD63700GF to located the zero crossing points of the TEY signal to :

1) Determine how many tracks have been crossed during track jumping or a carriage move operation.
2) Determine in which direction the lens is moving when attempting to close tracking. This is used in the "tracking brake" circuit described later.

For signals in the range 500Hz - 5kHz :

VTEC1 = R1005/R1006 x (E-F) = 45.5 x (E-F)

Typically TEC1 is around 4.2Vpp, this means that the TEC1 signal level may be greater than the saturation limit of the op-amp and the signal will clip. However, since the servo LSI only uses the zero-crossing points, this is not critical.

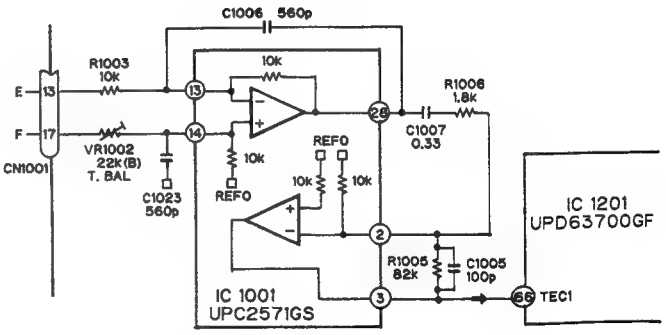


Fig.6 : TRACKING ZERO CROSSING AMPLIFIER

1.2 SERVO STAGE (UPD63700GF)

All the servo equalization & sequencing, such as focus closing, track jumping, carriage moving etc. are performed in this LSI, as well as all the DSP functions : data decoding, error protection, interpolation etc. The signals FE & TE are digitized and processed by the servo block to produce the focus, tracking & carriage drive signals, in a PWM format.

The RFI signal is converted to the EFM signal which is decoded by the DSP block to produce an audio signal ; during this process, a spindle servo error signal is also generated and used by the servo block to produce a spindle drive signal, again in PWM form.
The PWM waveforms are filtered, to remove the PWM carrier, amplified by the driver IC1301 PA3026, and output to the corresponding actuators.

1) Focus Servo System

The main focus equalization takes place inside the UPD63700GF (figure 7). The equalizer response can be measured between FEX and FIN and has the shape shown in figure 8.

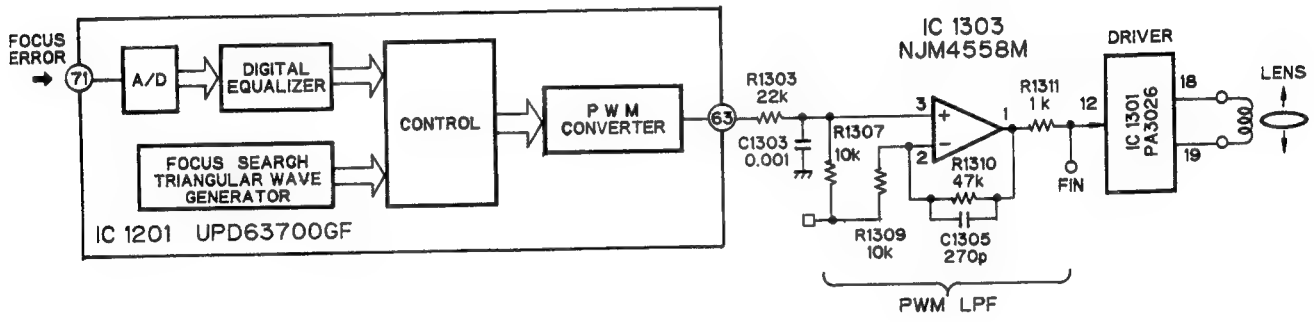


Fig.7 : FOCUS SERVO BLOCK DIAGRAM

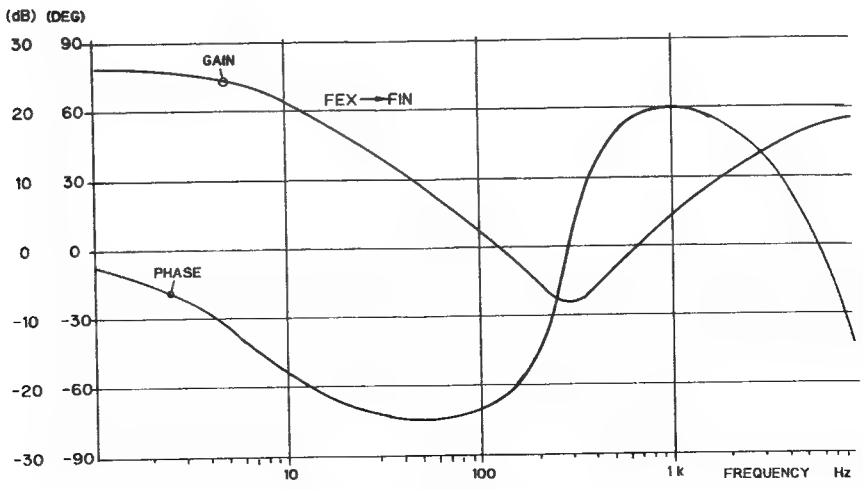


Fig.8 : FOCUS EQUALIZER

In order to smoothly close focus the lens must first be within approx. 5µm of the "just focused" position. This position is achieved by a focus search sequence. The lens is moved up and down using a triangular wave search voltage while the spindle motor is kicked and kept rotating at an appropriate speed. The servo LSI monitors the FE and RFO signals and, at an appropriate point, automatically closes focus.

The conditions for focus close are :

1) The lens is moving from a far to a near position relative to the disc,
2) FOK = HIGH (5V),
3) FZD (IC internal signal) was latched high and
4) FE = 0 (w.r.t. REFO).

When the focus servo closes, the servo LSI's serial data output port, XSO, will show a high-low transition. This is received by the microcomputer as an indication that the servo loop was closed and after about 25mS it begins monitoring the FOK output, via a LPF, to verify that focus is still closed ; in the event of FOK becoming low for an appreciable time, the microcomputer will take appropriate action.

The various signal levels which contribute to focus close are shown in figure 9, which shows the case where focus close has been inhibited.

In TEST MODE, using FOCUS CLOSE MODE 1, conditions 2 & 3 can be inhibited to allow the S-Curve, focus search voltage and the actual lens movement to be observed at ease.

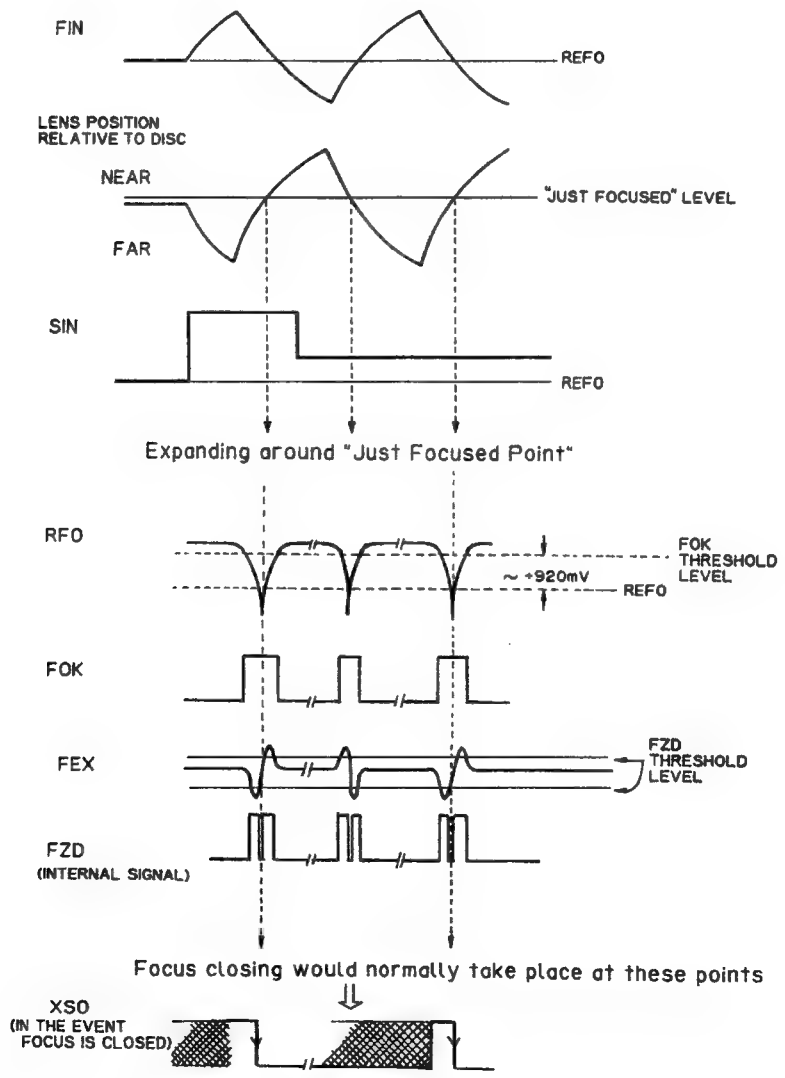


Fig.9 : FOCUS CLOSING SEQUENCE

a) FOK CIRCUIT

The FOK circuit inside the servo LSI compares the lower envelope of the RFO signal with a threshold level fixed by the microcomputer. Should the envelope level fall below this FOK level then FOK becomes high. This is used during focus close as stated and also during play to control a defect circuit, which switches the focus & tracking servos into a hold mode should the RFO envelope become disrupted by dirt, grease etc, thus increasing the player's defect response (figure 10).

The FOK threshold is approx. +920mV w.r.t. REFO. It is for this reason that the upper envelope should be adjusted to +1.1V DC w.r.t. REFO.

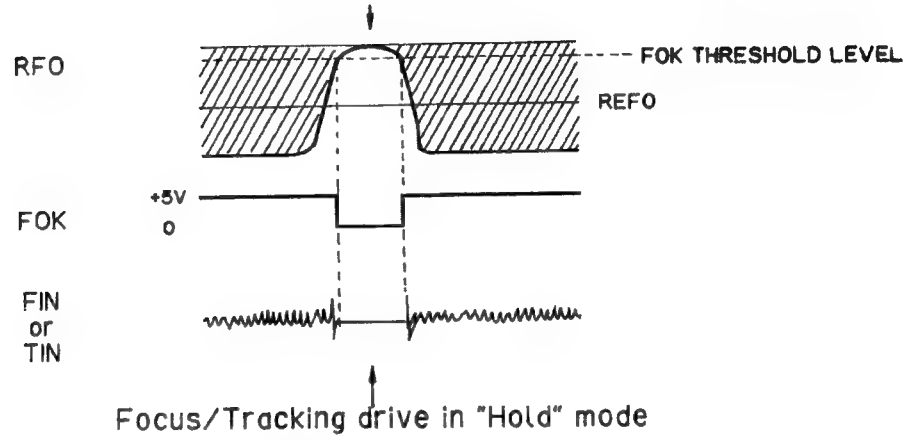


Fig.10 : DEFECT CIRCUIT

b) FZD CIRCUIT

The FZD circuit inside the servo IC compares the absolute value of the FE signal to a threshold value and outputs a high/low signal which is then used in the focus close sequence as stated.

At power on, the microcomputer switches the laser diode off and reads the value of the FE bias via the servo LSI's A/D port. The FZD threshold is set 200mV above this bias level.

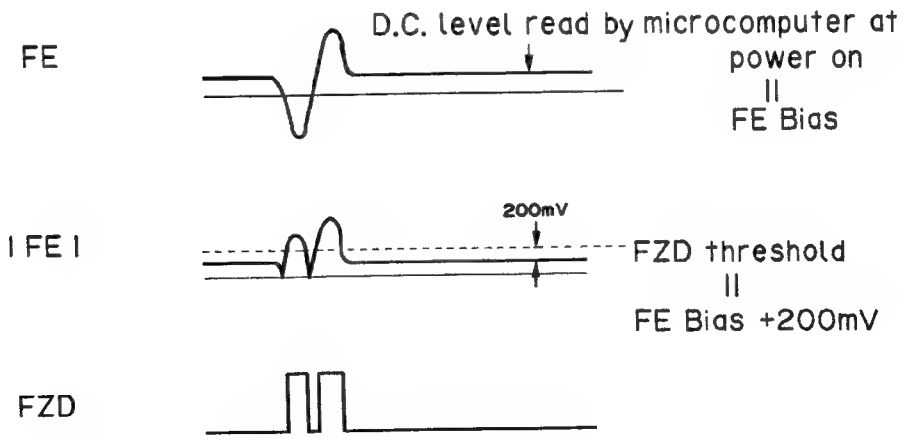


Fig.11 : FZD CIRCUIT

2) Tracking Servo System

The main tracking equalization takes place inside the UPD63700GF (figure 12). The equalizer response can be measured between TEX and TIN and will have the shape shown in figure 13.

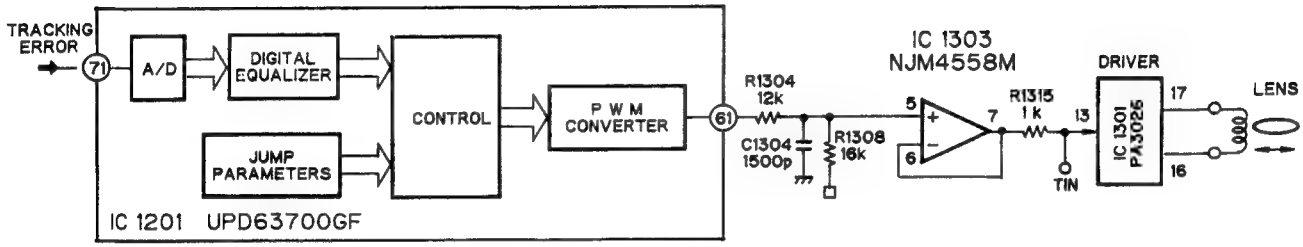


Fig.12 : TRACKING SERVO BLOCK DIAGRAM

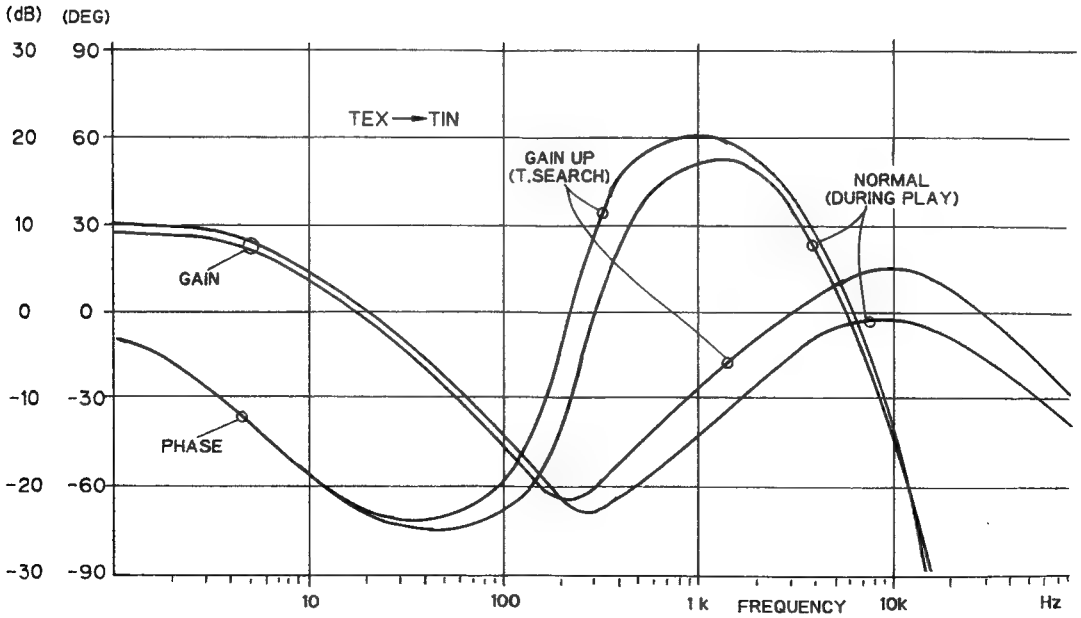


Fig.13 : TRACKING EQUALIZER

a) Track Jumping

Track jumping is performed automatically by the servo LSI upon receipt of the appropriate command from the microcomputer. The present microcomputer is programmed to use 1,4,10 & 32 track jump commands to achieve searching. The 32 track jump command may be used in pairs (64 tracks) or triplets (100 track) as required. In TEST MODE the 1,4,10,32 & 100 track jump and carriage move sequences may be observed by selecting the appropriate mode.

Note that the number of tracks jumped is controlled by setting an internal counter to half the total value and then counting this down using the zero crossing edges of TEC1. Once the counter is at zero, a brake pulse of fixed duration is output to bring the lens to a halt; allowing tracking to be closed and normal play to continue.

For a fixed period of time after a multi-track jump has been performed, a "tracking brake" circuit is activated in conjunction with a "gain-up" equalizer to ensure that the servo achieves stabilization before entering normal play.

Manual track search, in normal mode, uses a group of single track jumps to achieve FWD/REV at approx. ten times normal play speed.

The figures 14 & 15 show the timing charts for the single and multiple jump commands.

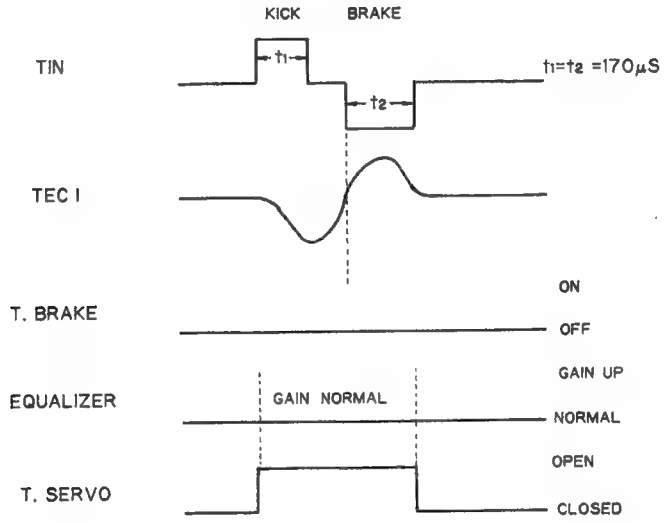


Fig.14 : SINGLE TRACK JUMP

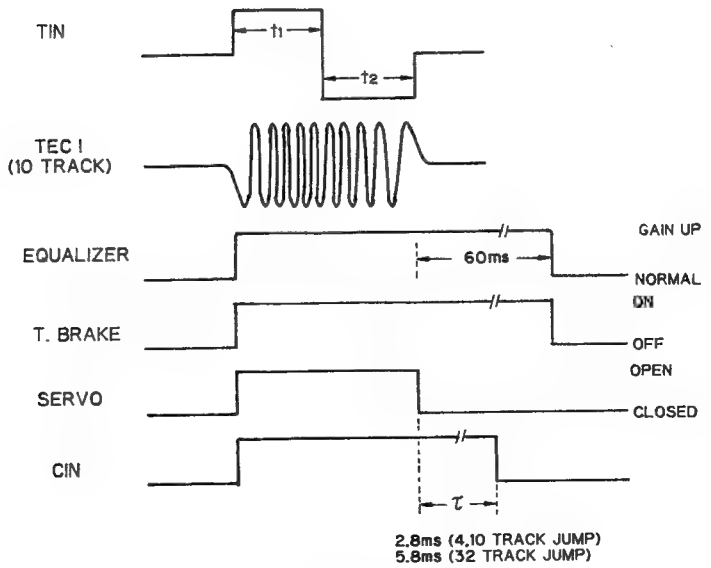
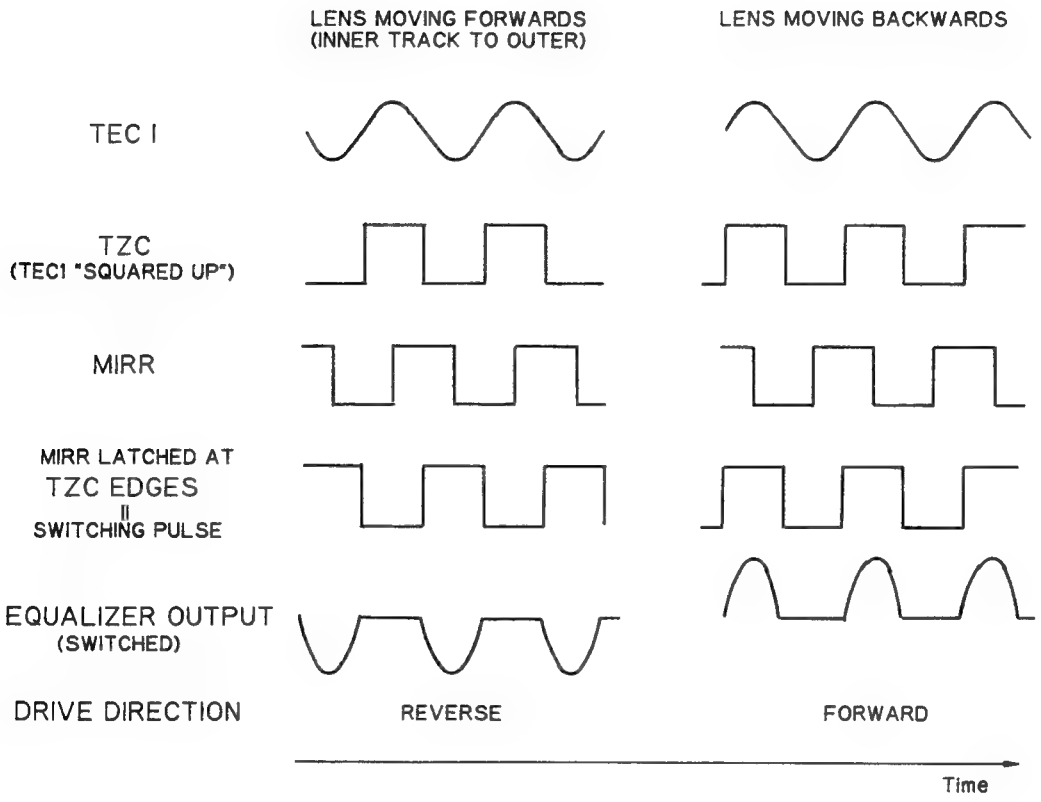


Fig.15 : MULTI TRACK JUMP

b) Tracking Brake Circuit (Figure 16)
This relies on determining which direction the lens is moving and only outputting the portion of the drive waveform which acts to oppose this motion. Direction of motion is deduced from TEC1 and the MIRR signal and knowledge of their phase relation.



Note : Equalizer output assumed to have same phase as TEC1.

Fig.16 : TRACKING BRAKE CIRCUIT

c) MIRROR Circuit

The MIRR circuit indicates if the laser beam is on or off track.

MIRR = 'H' => off track, MIRR = 'L' => on track.

MIRR is generated by detecting the upper and lower envelopes of the RFO waveform and producing a difference signal which is then compared with a peak-held version of itself to determine if the envelope size has dropped below a certain percentage.

If so, this is assumed to be due to the beam going off-track ; in practice dirt on the disc can also give the same effect (see figure 17).

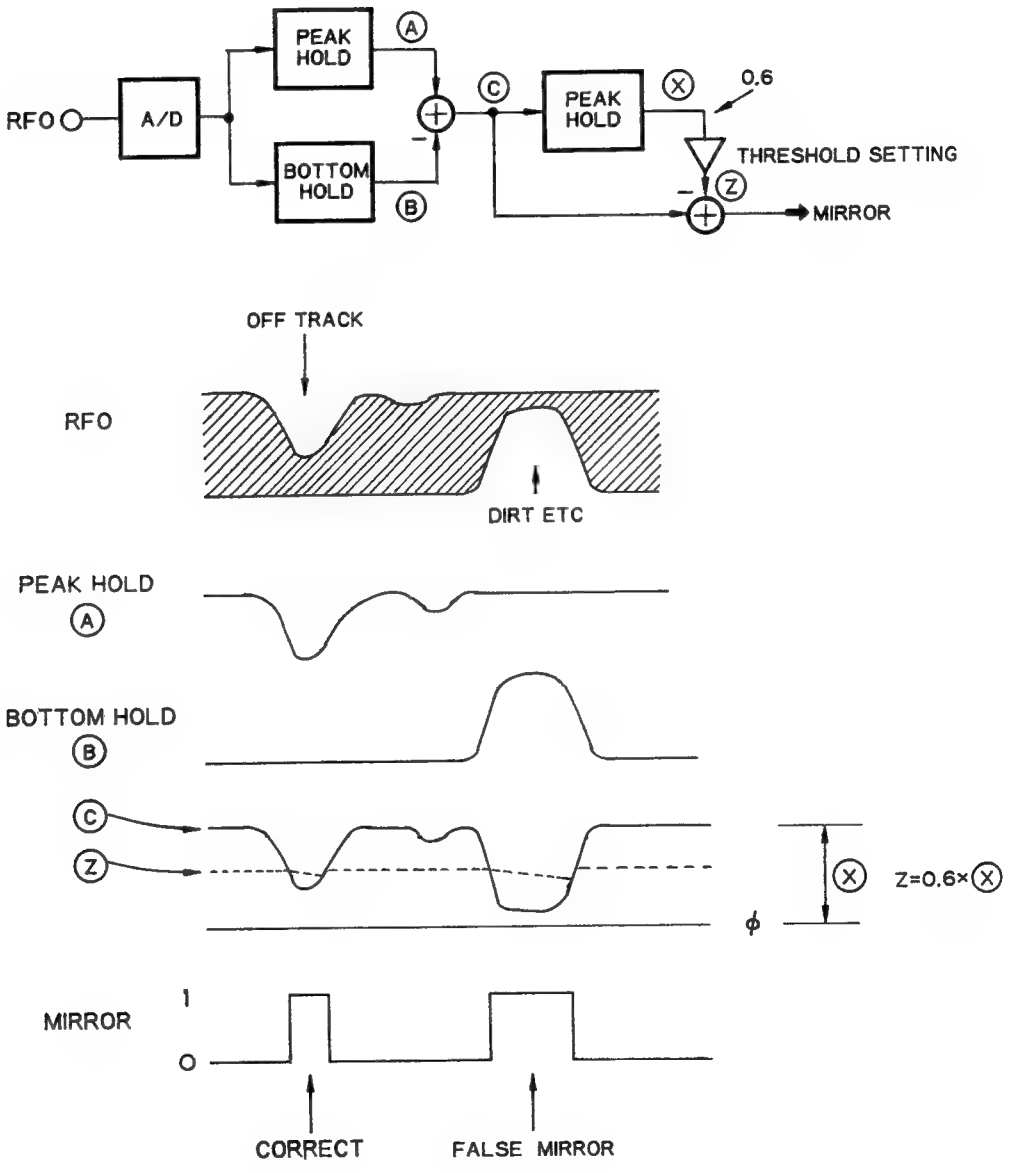


Fig.17 : MIRROR CIRCUIT & SIGNAL DIAGRAM

3) Carriage Servo System

The carriage servo system takes it's input from the low frequency component of the tracking equalizer output. This is amplified and equalized, and the output fed to the carriage motor via the PWM converter, LPF and driver IC. The gain of the equalizer is set so that when the lens is offset from it's center by a set amount the voltage at the carriage motor is enough to overcome friction and move the carriage forward.

Because the carriage motor will only begin moving when the applied voltage is great enough to overcome friction the drive voltage is cut-off inside the servo LSI until it reaches an appropriate level ; thus saving on wasted power dissipation.

Due to eccentricity of the disc etc. the threshold level may be crossed several times before the carriage assembly actually moves. This can result in a series of pulses being applied to the carriage motor.

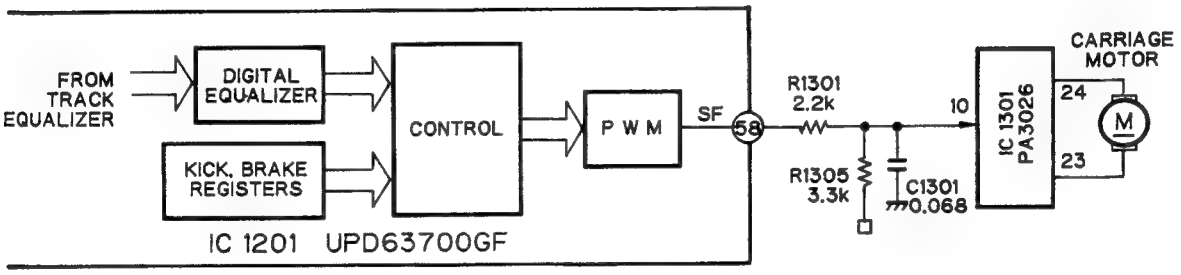


Fig.18 : CARRIAGE SERVO CIRCUIT

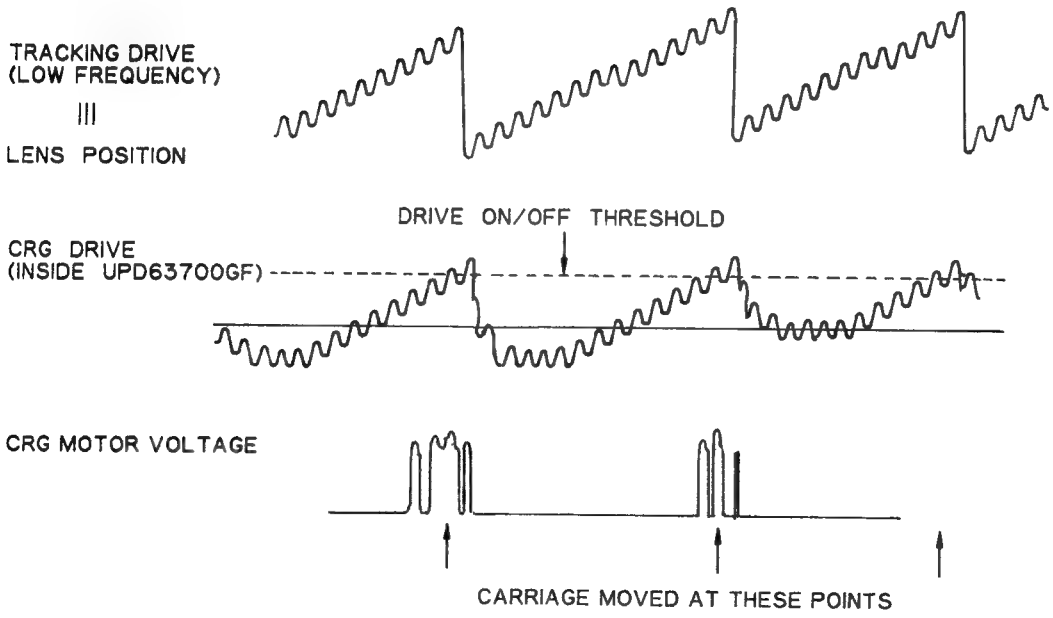


Fig.19 : CARRIAGE WAVEFORM

4) Spindle Servo

The spindle servo has a number of different modes :

(i) Kick : Used at set-up to bring the spindle up to speed from stand-still.

(ii) Offset : This is used i) At set-up, after spindle kick and before AGC has finished.
ii) During play if focus is suddenly disrupted.

(iii) Adaptive Servo : This is the CLV mode which ensures that the linear velocity of the disc as seen by the laser spot is kept constant. During play, a timing signal is extracted from the EFM signal and used to generate speed and phase error signals. These error signals are summed and fed into a servo equalizer to produce a drive signal via the PWM converter.

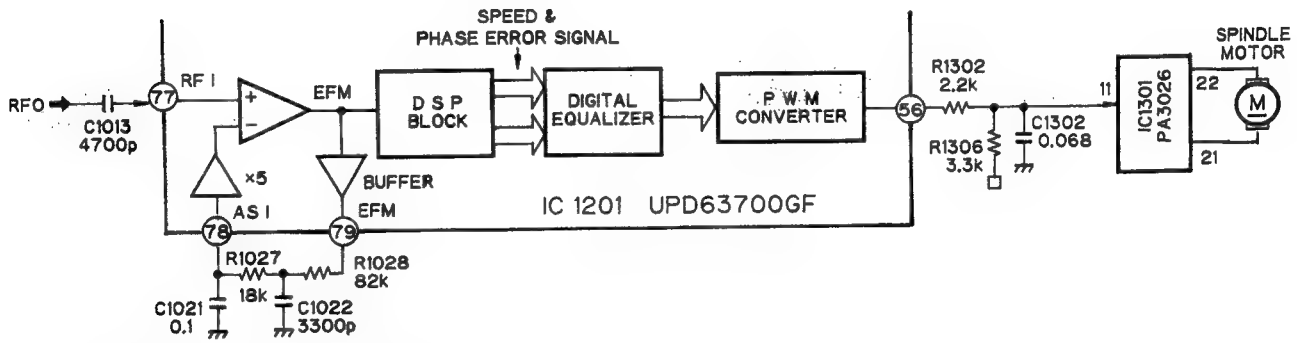
(iv) Brake : This is used to bring the disc to a stop quickly, for ejection or when CD source is de-selected or for any other reason. The servo LSI puts out a brake level and monitors the EFM signal. When the longest pattern in the EFM signal is longer than a fixed amount an internal flag is set. By monitoring this flag the microcomputer can judge when the disc has stopped and proceed to eject etc. If this flag is not set within a certain time limit the servo is switched to STOP mode and eject is implemented after a wait period.

(v) Stop : This occurs at power on or during disc eject. The spindle motor voltage is zero.

(vi) Rough : This is used in normal mode to control the linear velocity of the disc when the carriage is being moved for fast access. A speed signal is deduced from the EFM waveform and input to the spindle equalizer. This mode should be used in TEST MODE to perform the grating adjustment.

a) EFM Comparator

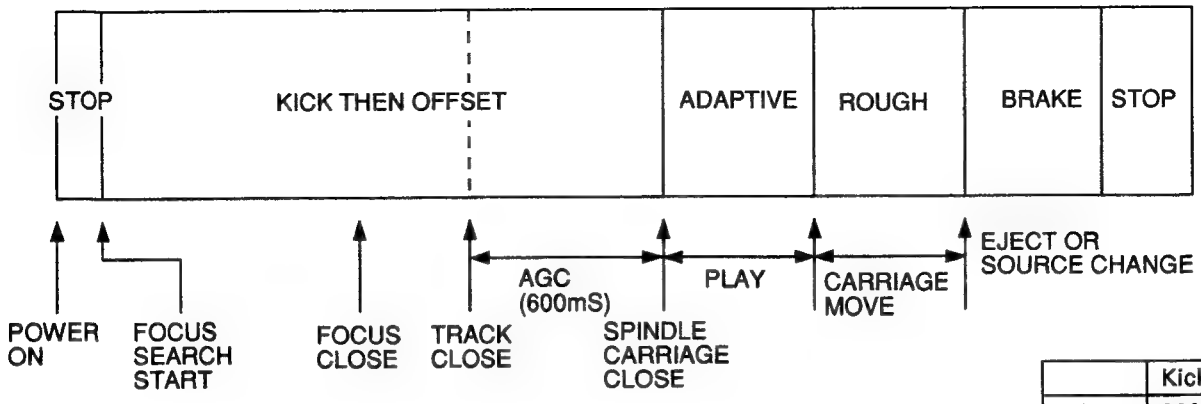
This circuit 'squares' up the analog RF signal into a digital EFM signal. In order to ensure minimum errors it is necessary to use a feedback circuit to match the DC level of the threshold to the center of the RF waveform. This circuit (shown in the spindle servo block diagram) uses the fact that the EFM signal should have no DC component. By feeding back the EFM signal's DC level the threshold level changes until the DC level is zero and the threshold, by definition, is at the exact center of the RFI waveform. The filtering in the feedback has been adjusted to ensure minimum error.



(EFM Compalator Circuit)

Fig.20 : SPINDLE CIRCUIT

• Normal Mode



	Kick Time
12cm	800mS
8cm	300mS

• Test Mode

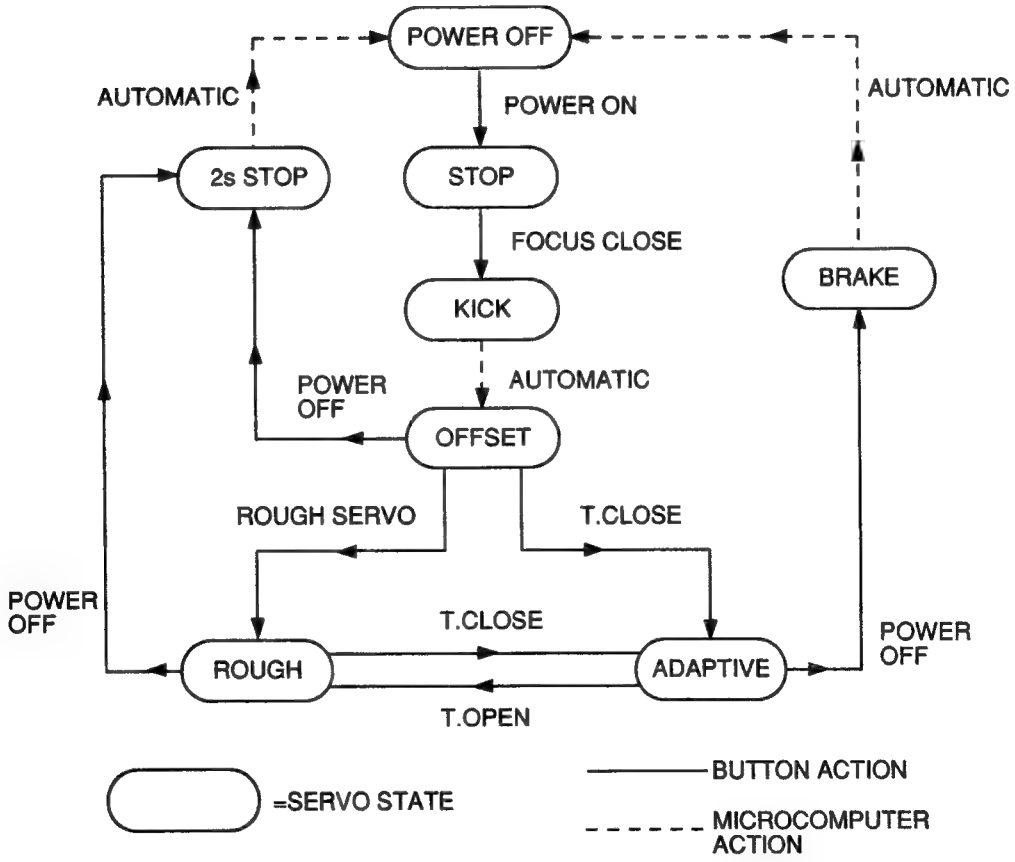


Fig.21 : SPINDLE SERVO MODES

5) Automatic Gain Control (AGC)

The servo LSI UPD63700GF contains a new function which allows the microcomputer to automatically adjust the gain of the focus and tracking servos every time a new disc is inserted or the CD source is selected.
The block diagram of the AGC circuit is shown in figure 22. Basically, a small disturbance signal is inserted into the servo loop at a fixed frequency and the response of the loop is measured via the filtered signals G1 and G2. For a properly adjusted servo loop the amplitudes of G1 and G2 should be equal. The microcomputer reads in these values, does a simply calculation and adjusts the loop gain appropriately.
In order to achieve a high degree of accuracy this adjustment is performed a number of times.
As long as there is power supplied to the microcomputer it remembers the previous adjustment point and uses this as a starting point. Thus, should the system degrade with time (actuator sensitivity, dirt build-up, circuit degradation etc.) the microcomputer can follow this trend and keep the loop gain optimized.
If power to the microcomputer is removed, it forgets the previous adjustment point and assumes a default value.

At shipping the CD player will be within 5dB of this default and no problems should occur. For an older player however this is not so and it is possible that servo closure may not take place immediately. In this case, the microcomputer adjusts the gain 'blind', searching for a stable point.
In TEST MODE, the result of the AGC can be monitored. Once tracking close (with AGC) has been performed the set can be made to display the present value of the gain block. The default value is displayed as '20', which is the value a typical PU unit, PCB & test disc would result in. If for some reason the loop gain had dropped by, say, 6dB (1/2 the typical value) then the gain block will be adjusted during AGC to twice it's default value ; resulting in a gain of '40'. Similarly a set with a loop gain twice the typical will display '10' as the present gain.
Using this, it is possible to 'measure' the loop gain of the servo without the need for any instrumentation. The players shipped from the factory are checked with a test disc so that the value of the gain block after AGC is within the range 11 - 45.

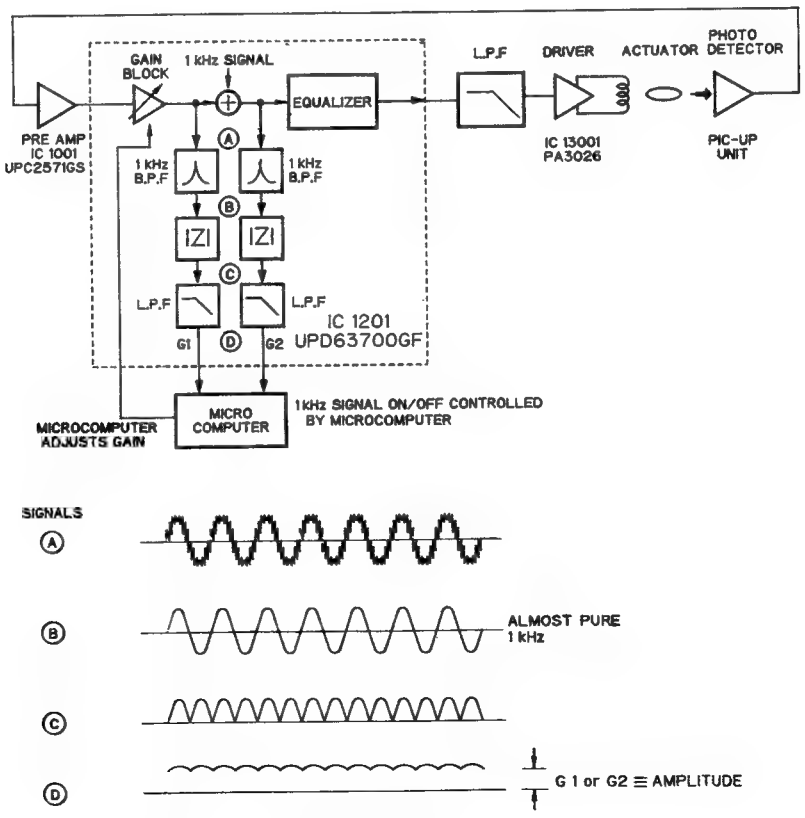


Fig.22 : AGC BLOCK DIAGRAM

6) Power Supply & Loading Motor

Figure 23 shows the block diagram of the power supply and loading motor.

The CD module receives VD (9V) and splits this up into BVD (8.3V), VM (7.6V), and V1 (7.0V) which supply the 4ch servo driver, loading motor and 5V regulator respectively. VD is also used directly by the disc detection LED's. The 4ch driver and laser diode are enabled by the CONT line from the microcomputer. The 5V supply to the servo LSI, pre-amp and audio circuits is enabled by the CD5VON line. The loading motor has no separate enabling input ; the control lines LOAD and EJ serve the same purpose.

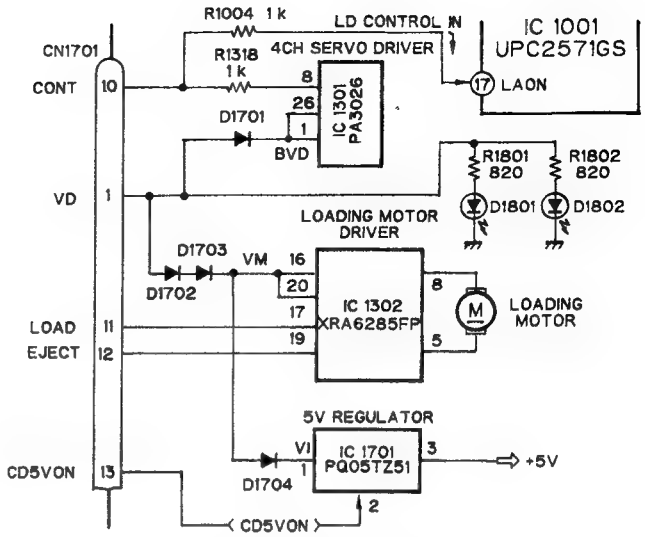


Fig.23 : POWER SUPPLY & LOADING MOTOR

2. MECHANISM DESCRIPTION

● Disc Loading

1.There are two photo transistors in front and behind the rubber roller that convey the disc, and two corresponding LEDs mounted on the unit pcb.
(When the LEDs light, the photo transistor voltage is L.)

2.When the disc is inserted to a point in front of the rubber rollers, a H voltage is recorded on the photo transistor in the front section(P1) and the loading motor starts.

3.The motor drive is transmitted via the gears, the rubber rollers revolve, and the disc is conveyed.
The rubber rollers are held on the tip of the loading arm by the strength of the loading arm spring, and the guide arm is in the raised position.
This gives the guide arm and rubber roller a suitable adhesive strength to push forward the disc which is positioned between them.

4.The clamper arm distinguishes the size of the disc and has a centering mechanism which clamps the disc in the center of the spindle motor.

The centering arm and centering lever are a single unit on top of the clamper arm, which keeps the fulcrum movement centered.

Centering pins and lock arms are attached to the tips of the centering arm.

The centering pins are positioned so that when an 8cm disc is positioned above the spindle motor it's external edge touches the pins. Lock arms revolve around the centering pins. For an 8cm disc it is locked in place by the clamper arms. For a 12cm disc, the lock is released and moves according to the broken line in figure 25.

The position of the detect arm which is mounted on the centering arm at the bottom right of the figure differs for 8cm and 12cm discs. When a disc is positioned above the spindle motor the detect lever, which moves in a clockwise direction on the outside edge, moves to the lower section of the figure.

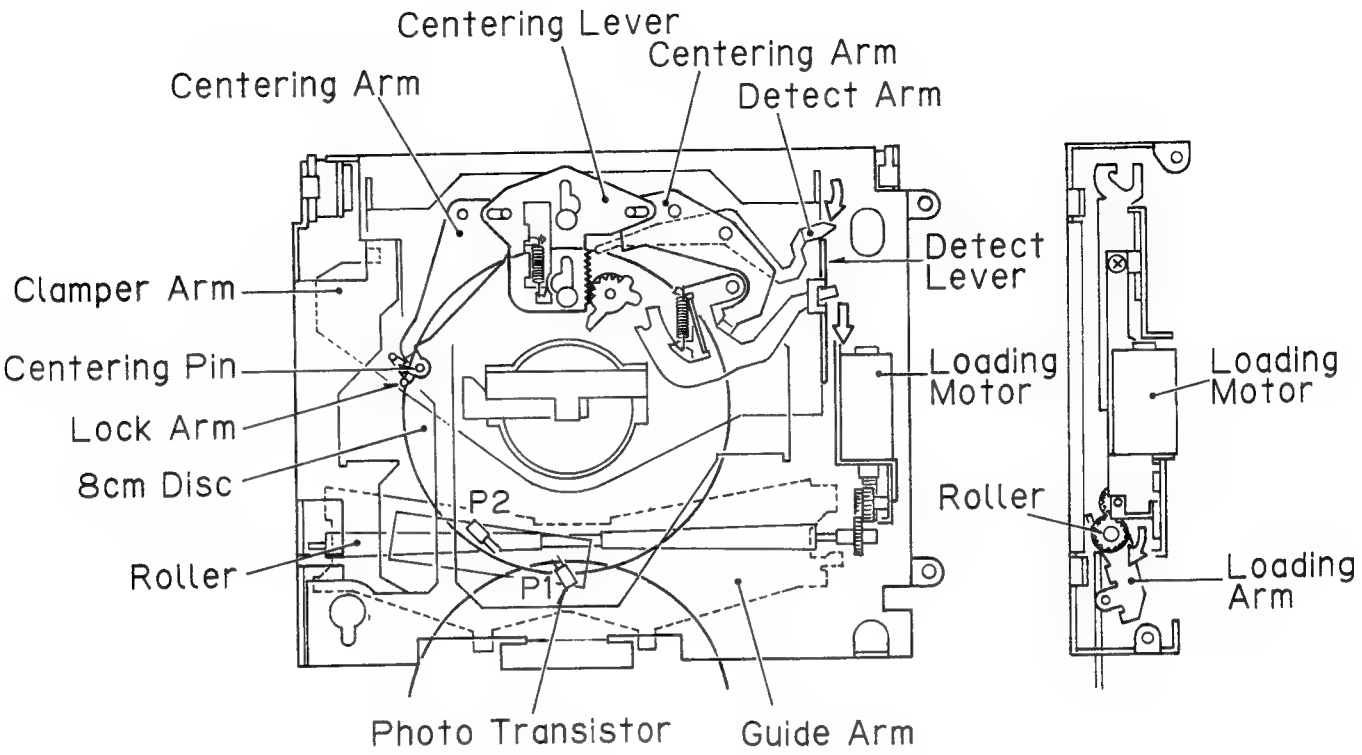

Centering Lever
Centering Arm
Centering Arm
Detect Arm
Clamper Arm
Centering Pin
Lock Arm
8cm Disc
Roller
P2
P1
Detect Lever
Loading Motor
Loading Motor
Roller
Loading Arm
Photo Transistor
Guide Arm

Fig.24

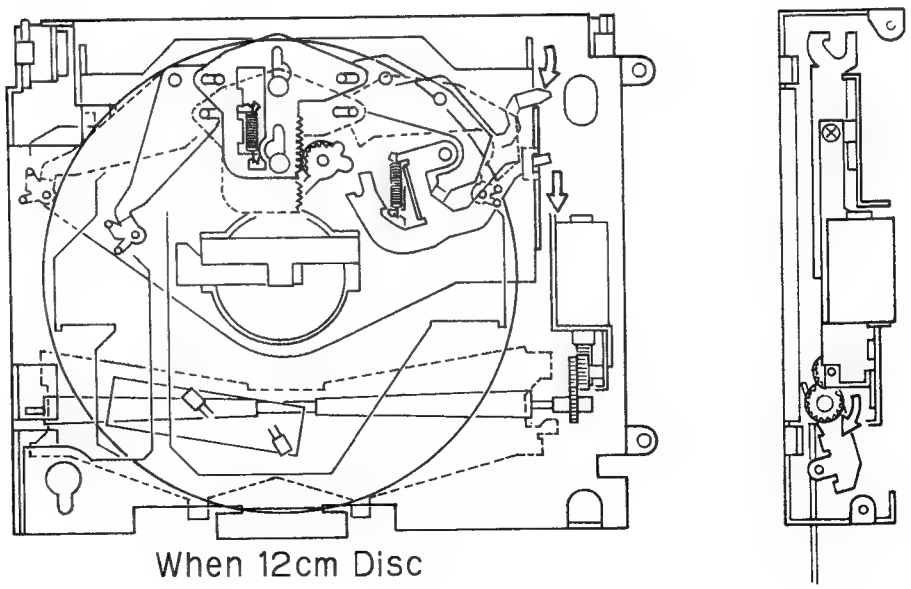

When 12cm Disc

Fig.25

● Clamp Operation

1.The rack gear in contact with the detect lever is engaged with the gear driven by the loading motor, thereby moving the L arm in the arrow direction.
The clamper arm, which had been raised by the L arm, moves down and clamps the disc.

The lock lever which interlocks with the L arm moves the loading arm.
As a result, the rubber roller is pushed down, leaving the disc. At the same time, the guide arm moves down, too. At the position where the lock lever turns the clamp switch on, loading comes to an end.

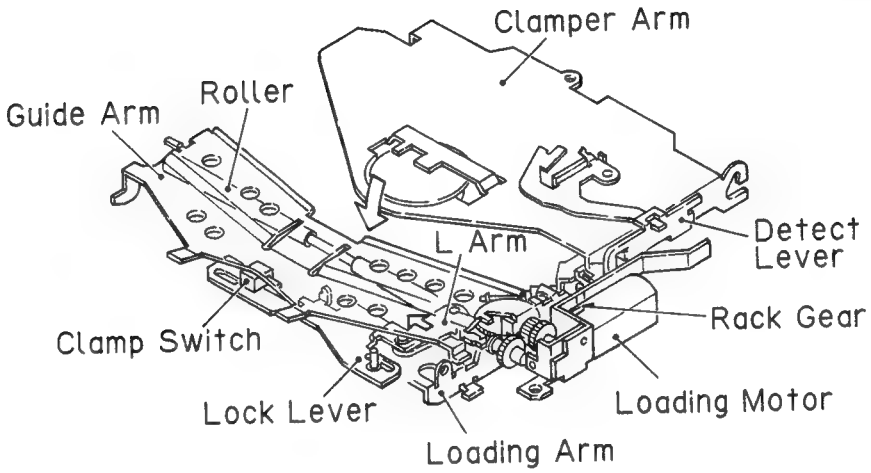


Fig.26

● Mechanism Lock

1.In the eject condition two lock arms are positioned in the frame hole and the front side of the floating section is locked in both vertical and horizontal directions.

The L arm moves the rotating lock lever to the left. The mechanical lock arms L and R move in the directions designated by the arrows and the floating section is released from the frame.

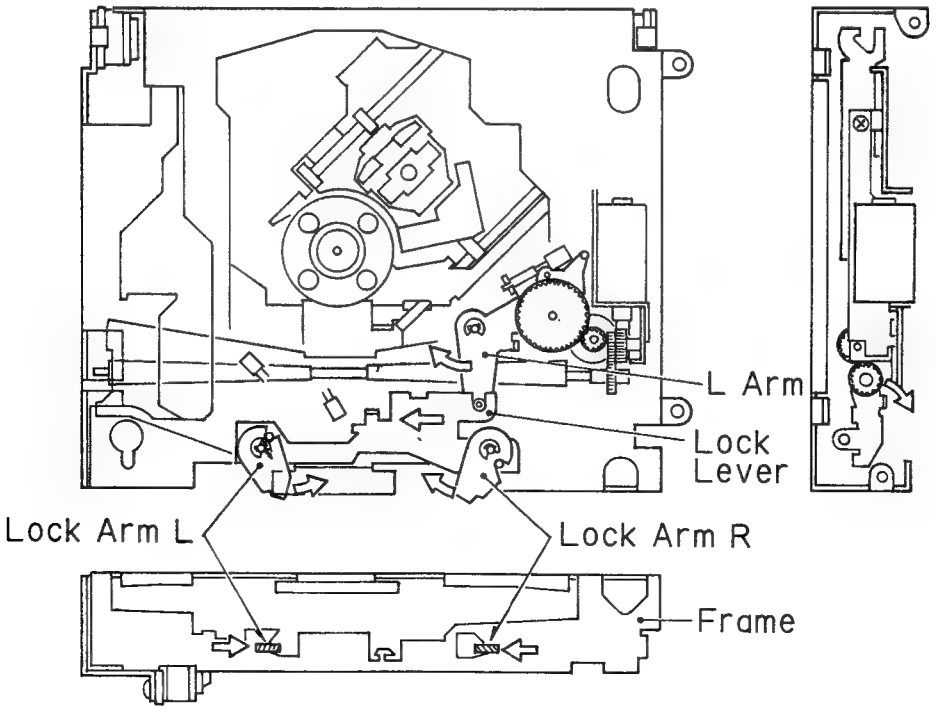


Fig.27

● **Eject**

1.The eject mechanism operates by reversing the rotation which takes place when the loading motor loads. The L arm moves and operates the mechanical lock, the clamp is released, the roller is applied, and the disc is conveyed. In the case of a 12cm disc the loading motor stops at the position at which the photo transistor lights at the rear of the rubber roller section.

However, in the case of an 8cm disc, motor revolution stops after a fixed period of time. In this process the disc type is recognized during play, by the voltage of the photo transistor(P1) located in front of the rubber rollers.

3. DISASSEMBLY

● **How to Remove the Dampers**

(Fig.28)

1. While keeping the CX-540 powered on, insert a disc and put it into play mode (with the arm unit lowered).
2. Power off the CX-540 while in play mode.
3. Unplug the connector and remove the CX-540.

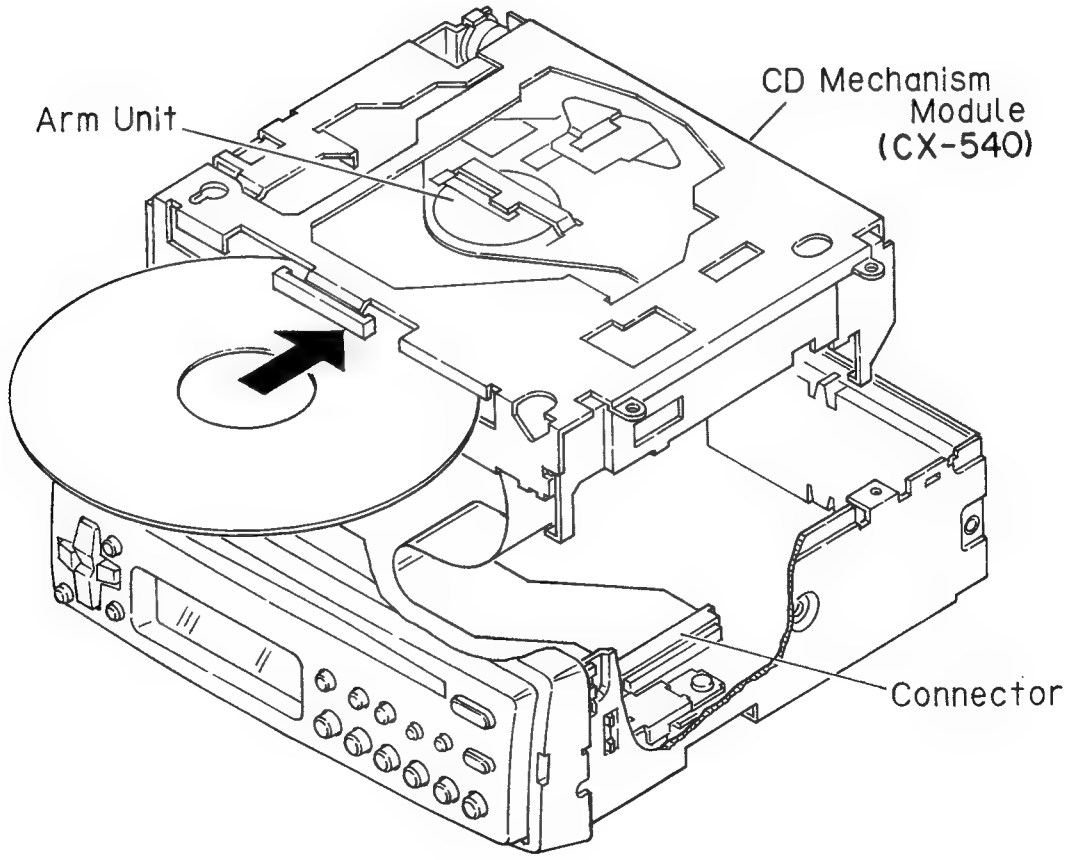


Fig.28

(Fig.29)

4. Unfasten the four screws marked with arrows.
5. Unfasten the two screws A and remove the frame.
6. Unfasten the two screws B and remove both damper and holder at the two locations.

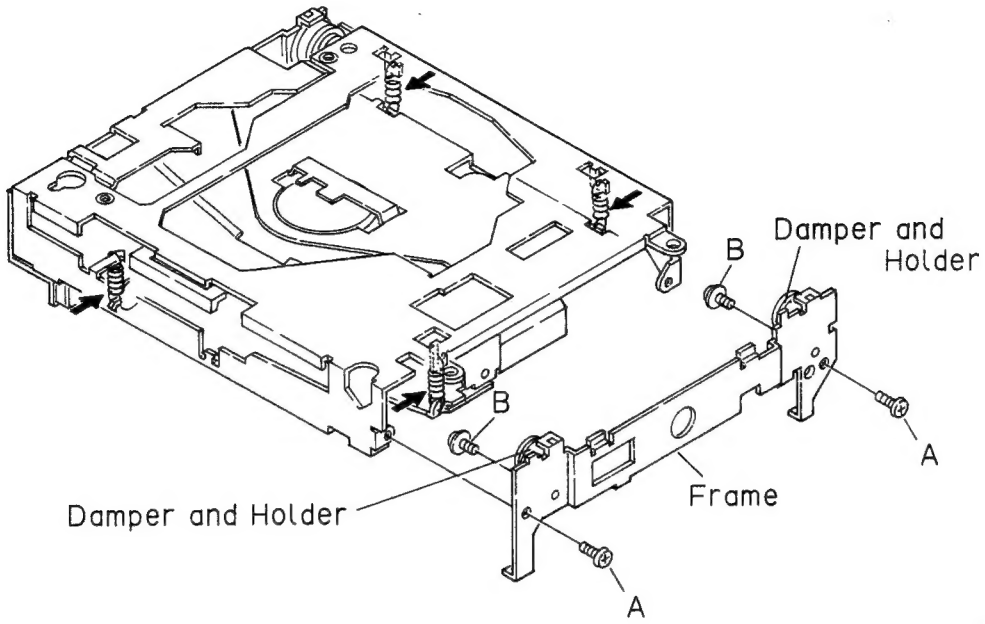


Fig.29

(Fig.30)

7. Remove the frame unit.
8. Unfasten the two screws and remove both damper and holder at the two locations.

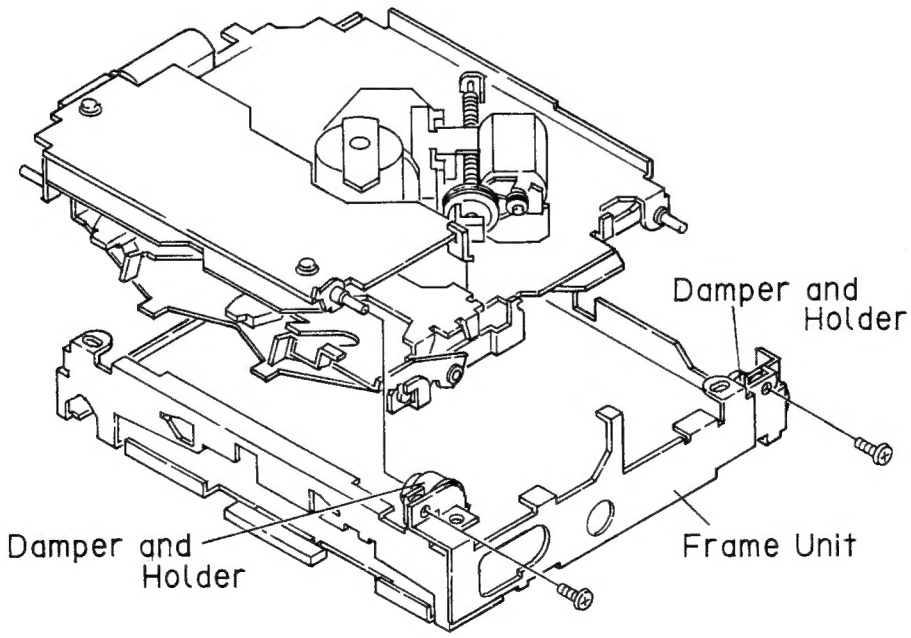


Fig.30

● How to Remove the Spindle Motor

(Fig.31)

1. Remove spring A as marked with an arrow.
2. Remove springs B and C and the arm unit.
3. Remove spring D and the lever.
4. Turn the support wheel so that the screw head becomes visible through the hole.
5. Unfasten the two screws and remove the spindle motor.

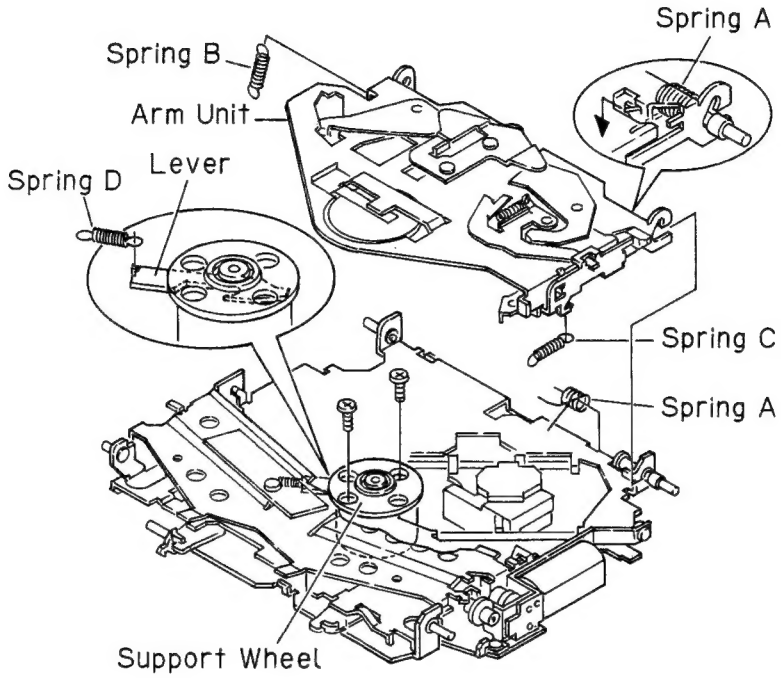


Fig.31

● How to Remove the Loading Motor

(Fig.32)

1. Remove the washer and the arm.
2. Remove the spring.

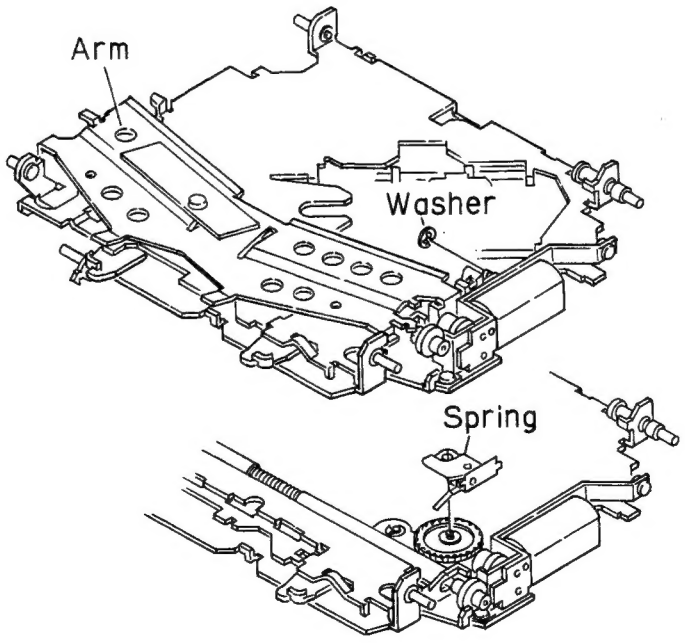


Fig.32

(Fig.33)

3. Unfasten the two screws and remove the bracket unit.

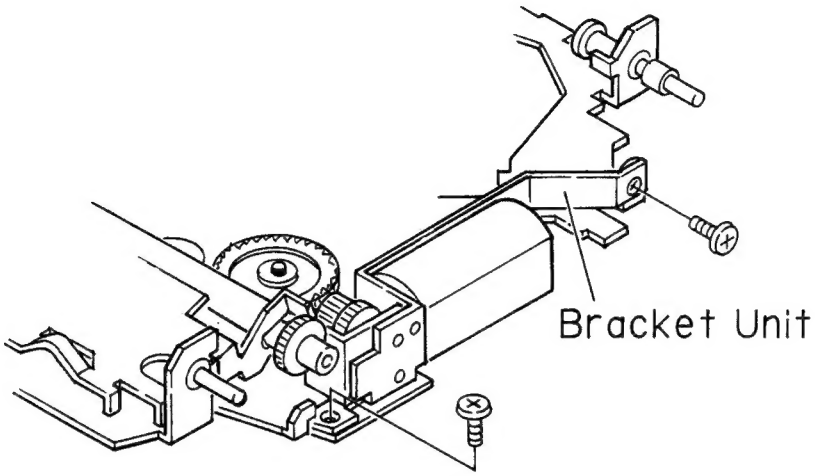


Fig.33

(Fig.34)

4. Unfasten screw C and remove both gear unit and gear.
5. Unfasten the two screws D and remove the loading motor.

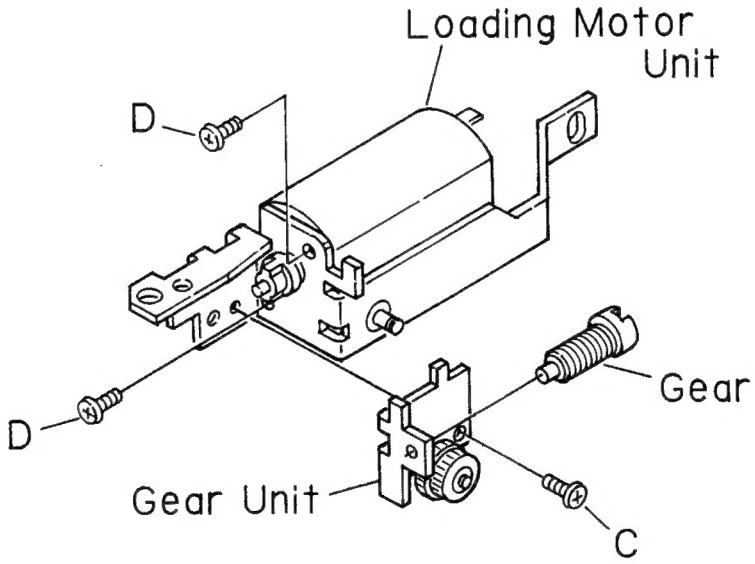


Fig.34

● How to Remove the PU Unit and the Carriage Motor

(Fig.35)

1. Latch spring E as marked with an arrow in the illustration.
2. Attach a short pin to protect the PU unit.
3. Unplug the connector.
4. Unfasten the screw and remove spring F.
5. Remove the PU unit.

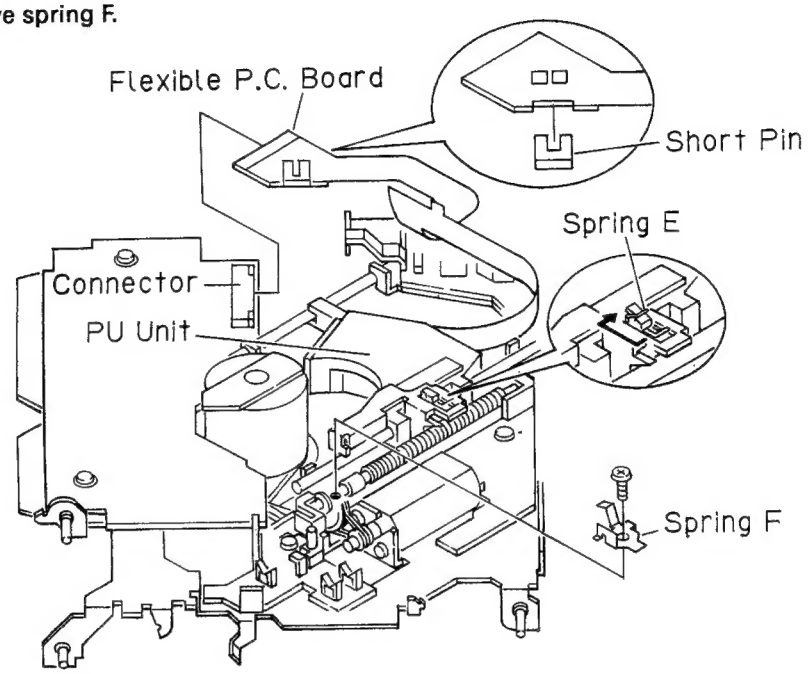


Fig.35

(Fig.36)

6. Unfasten screw E and remove the holder, belt and screw unit.
7. Unfasten the two screws F and remove the carriage motor.

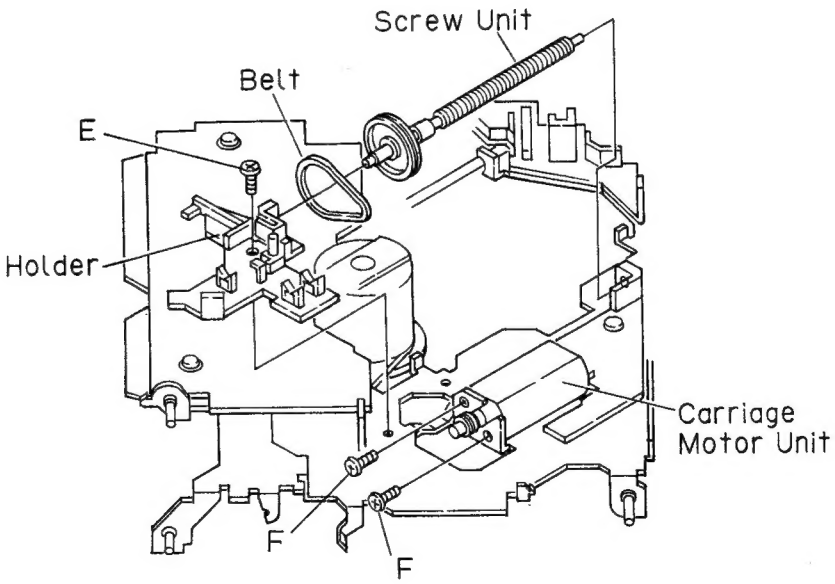


Fig.36